

# FEDERAL TELECOMMUNICATIONS MARKET

1992 - 1997

INPUT

# About INPUT

INPUT is a worldwide consulting and market research firm uniquely focused on the information technology services and software markets. Executives in many technically advanced companies in North America, Europe, and Japan rely on INPUT for data, objective analysis, and insightful opinions to support their business plans, market assessments, and technology directions. By leveraging INPUT's considerable knowledge and expertise, clients make informed decisions more quickly, and benefit by saving on the cost of internal research.

Since 1974, INPUT has compiled the most extensive research base available on the worldwide information services market and its key segments, providing detailed market forecasts, vertical industry sector analysis and forecasts and analysis of vendor strategies and products. INPUT delivers specific expertise in the fast changing areas of outsourcing, systems integration, EDI/electronic commerce, software development/CASE, and on the impact of downsizing.

Consulting services are provided by more than 50 professionals in major international business centers. Clients retain INPUT for custom consulting/proprietary research, subscription-based continuous advisory programs, merger/acquisition analysis and detailed studies of U.S. federal government IT procurements.

Most clients have retained INPUT continuously for a number of years, providing testimony to INPUT's consistent delivery of high-value solutions to complex business problems. To find out how your company can leverage INPUT's market knowledge and experience to gain a competitive edge, call us today.

## INPUT OFFICES

### North America

#### San Francisco

1280 Villa Street  
Mountain View, CA 94041-1194  
Tel. (415) 961-3300 Fax (415) 961-3966

#### New York

Atrium at Glenpointe  
400 Frank W. Burr Blvd.  
Teaneck, NJ 07666  
Tel. (201) 801-0050 Fax (201) 801-0441

#### Washington, D.C. - INPUT, INC.

1953 Gallows Road, Suite 560  
Vienna, VA 22182  
Tel. (703) 847-6870 Fax (703) 847-6872

### International

#### London - INPUT LTD.

Piccadilly House  
33/37 Regent Street  
London SW1Y 4NF, England  
Tel. (071) 493-9335 Fax (071) 629-0179

#### Paris - INPUT SARL

24, avenue du Recteur Poincaré  
75016 Paris, France  
Tel. (1) 46 47 65 65 Fax (1) 46 47 69 50

#### Frankfurt - INPUT LTD.

Sudetenstrasse 9  
W-6306 Langgöns-Niederkleen, Germany  
Tel. 0 6447-7229 Fax 0 6447-7327

#### Tokyo - INPUT KK

Saida Building, 4-6  
Kanda Sakuma-cho, Chiyoda-ku  
Tokyo 101, Japan  
Tel. (03) 3864-0531 Fax (03) 3864-4114



M A R C H 1 9 9 2

---

# FEDERAL TELECOMMUNICATIONS MARKET

1992-1997

**INPUT®**

Published by  
INPUT  
1953 Gallows Road, Suite 560  
Vienna, VA 22182-3934  
U.S.A.

**Federal Information Technology Market  
Program (FITMP)**

***Federal Telecommunications Market, 1992-1997***

Copyright © 1992 by INPUT. All rights reserved.  
Printed in the United States of America.

No part of this publication may be reproduced or distributed in any form, or by any means, or stored in a data base or retrieval system, without the prior written permission of the publisher.

The information provided in this report shall be used only by the employees of and within the current corporate structure of INPUT's clients, and will not be disclosed to any other organization or person including parent, subsidiary, or affiliated organization without prior written consent of INPUT.

INPUT exercises its best efforts in preparation of the information provided in this report and believes the information contained herein to be accurate. However, INPUT shall have no liability for any loss or expense that may result from incompleteness or inaccuracy of the information provided.



## Abstract

INPUT estimates that the federal government communications and network services market will increase from \$5.0 billion in FY 1992 to \$7.1 billion by FY 1997, a compound annual growth rate of 7%.

Most federal telecommunications expenditures remain concentrated in leased telecommunications services. Agencies continue to experience procurement problems in the postdivestiture environment. Purchases have been delayed by reorganization issues and staff shortages, as well as by a reluctance to accept new technology.

Budget constraints continue to impact procurement considerations; however, growing acceptance of FTS 2000 will alleviate some of the difficulties.

This report highlights major telecommunications initiatives scheduled for implementation over the next five years. Its emphasis is on GSA's FTS 2000 and consideration of the need for new technologies such as VSATs, cellular communications and network services like E-mail and electronic commerce.

The report also examines the impacts of regulation, policy, and standards on future telecommunications acquisitions. Other major issues covered in the report include OSI standards, technological impacts, and competitive trends.

The report contains 168 pages, including 64 exhibits.



Digitized by the Internet Archive  
in 2015

<https://archive.org/details/federaltelecommu02unse>

# Table of Contents

<b>I</b>	<b>Introduction</b>	<b>I-1</b>
	A. Scope	I-1
	B. Methodology	I-2
	C. Report Organization	I-2
<b>II</b>	<b>Executive Overview</b>	<b>II-1</b>
	A. Federal Market Pressures	II-1
	B. Federal Telecommunications Market Segments	II-2
	C. Market Environment	II-4
	D. Market Forecast, 1992-1997	II-5
	E. Technical Trends	II-6
	F. Issues and Problems	II-8
	G. Leading Agencies	II-9
	H. Competitive Outlook	II-10
	I. Recommendations	II-12
<b>III</b>	<b>Market Analysis and Forecast</b>	<b>III-1</b>
	A. Federal Market Forces Through 1997	III-1
	B. Market Forecast	III-4
	C. Agency Forecast	III-9
	1. Special Defense Considerations	III-10
	2. Leased Telecommunications Procurement	III-11
	D. Vendor Market Share and Competition	III-13
	E. Technological Impacts	III-14
	F. Policy and Regulatory Prospects	III-15
	G. Conclusions	III-17
<b>IV</b>	<b>Agency Requirements</b>	<b>IV-1</b>
	A. Key Players in Regulations, Standards, and Policy	IV-1
	1. Federal Communications Commission	IV-2
	2. National Telecommunications and Information Administration	IV-2



## Table of Contents (Continued)

### IV

3. National Communications Systems	IV-3
4. National Institute for Standards and Technology	IV-3
5. National Security Agency	IV-4
6. Office of Management and Budget	IV-5
B. Agency Plans	IV-5
1. Defense	IV-5
2. GSA	IV-8
3. Department of Energy	IV-9
4. Department of Agriculture	IV-9
5. State Department	IV-10
6. Preferred Acquisition Methods	IV-10
C. Technology Trends	IV-11
1. Voice and Data Services	IV-11
2. Network Management	IV-13
3. Local-Area Networks	IV-15
4. Network Integration	IV-16
5. Satellites and VSATs	IV-17
6. Cellular Communications	IV-17
7. E-Mail and EC	IV-17
8. ISDN	IV-18
9. Other	IV-19
10. Risk	IV-20
D. Agency Perspectives	IV-20
1. Nontechnical Impacts	IV-21
2. Effectiveness of Telecommunications Use	IV-21
3. Driving Forces	IV-22
4. Inhibiting Factors	IV-23
5. Vendor Weaknesses	IV-24
6. Agency Recommendations to Vendors	IV-25

### V

Implications of FTS 2000	V-1
A. Background	V-1
B. Status of Cutover	V-2
C. Service Scope Issues	V-4
1. International Service	V-4
2. Security and Encryption	V-4
3. Toll-Free Service	V-5
4. On-Net/Off-Net Services	V-5
5. Timesharing Services	V-6
6. Additional Services	V-6
7. Service Pricing	V-7
D. Agency Understanding and Acceptance	V-9
E. Vendor Perceptions	V-10
F. Prospects for Vendors	V-14

## Table of Contents (Continued)

### VI

<b>Competitive Trends</b>	<b>VI-1</b>
<b>A. The Marketplace</b>	<b>VI-1</b>
1. Leased Telecommunications Services	VI-2
2. Telecommunications Equipment	VI-4
3. Telecommunications Technical Support Services	VI-5
4. Telecommunications Maintenance Services	VI-7
<b>B. Federal Telecommunications Vendors</b>	<b>VI-8</b>
1. Leased Telecommunications Market	VI-10
2. Telecommunications Equipment Market	VI-12
3. Telecommunications Professional Services:	VI-15
Telecommunications Maintenance Services and	
Technical Support	
a. Telecommunications Maintenance Services Market	VI-15
b. Telecommunications Technical Support Market	VI-17
<b>C. Vendor Federal Telecommunications Market Plans</b>	<b>VI-19</b>
1. Market Direction	VI-19
2. Growth Factors	VI-21
3. Agency Opportunities	VI-21
4. Preferred Acquisition Methods	VI-23
5. Critical Technologies	VI-24
6. Standards	VI-24
<b>D. Vendor Concerns</b>	<b>VI-26</b>
1. Federal Organization and Staffing	VI-26
2. Vendor Improvements to Products and Services	VI-27
3. Factors Affecting Government Spending	VI-28
4. Agency-Required Actions	VI-29
<b>E. INPUT Recommendations</b>	<b>VI-30</b>

### Appendixes

<b>A. Interview Profiles</b>	<b>A-1</b>
<b>A. Federal Agency Respondent Profile</b>	<b>A-1</b>
1. Contact Summary	A-1
2. List of Agencies Interviewed	A-1
<b>B. Vendor Respondent Profile</b>	<b>A-2</b>
1. Vendor Size and Revenue	A-2
2. Vendor Products and Services	A-2
<b>B. Telecommunications Opportunities</b>	<b>B-1</b>
<b>A. Present and Future Programs</b>	<b>B-1</b>
<b>B. Telecommunications Funding Requests</b>	<b>B-2</b>
<b>C. Recent Telecommunications Awards 1/89 - 2/92</b>	<b>B-7</b>

# Table of Contents (Continued)

## Appendixes

C. Definitions	C-1
A. Introduction	C-1
B. Overall Definitions and Analytical Framework	C-2
1. Information Services	C-2
2. Market Forecasts/User Expenditures	C-3
3. Delivery Modes	C-3
4. Market Sectors	C-4
5. Outsourcing	C-4
C. Delivery Modes and Submodes	C-5
1. Software Products	C-5
a. Systems Software Products	C-7
b. Applications Software Products	C-7
2. Turnkey Systems	C-8
3. Processing Services	C-8
4. Systems Operations	C-9
5. Systems Integration	C-10
6. Professional Services	C-12
7. Network Services	C-12
a. Electronic Information Services	C-12
b. Network Applications	C-13
8. Equipment Services	C-14
D. Hardware/Hardware Systems	C-14
D. Glossary of Federal Acronyms	D-1
A. Federal Acronyms	D-1
B. General and Industry Acronyms	D-11
E. Policies, Regulations, and Standards	E-1
A. OMB Circulars	E-1
B. GSA Publications	E-1
C. DoD Directives	E-1
D. Standards	E-2
F. Related INPUT Reports	F-1
G. Questionnaires	G-1



# Exhibits

## II

-1	Federal Market Pressures	II-1
-2	Federal Telecommunications Market Segments, 1992	II-3
-3	Federal Telecommunications Market Environment	II-4
-4	Federal Telecommunications Market Forecast, 1992-1997	II-5
-5	Technical Trends	II-6
-6	Agency Problems and Issues	II-8
-7	Leading Federal Telecommunications Buyers/Suppliers	II-10
-8	Competitive Outlook	II-12
-9	Recommendations	II-13

## III

-1	Major Federal Telecommunications Market Impacts	III-2
-2	Federal Network Services Market Forecast, FY 1992-1997	III-3
-3	Federal Telecommunications Market Forecast, FY 1992-1997	III-4
-4	Federal Telecommunications Hardware Market Forecast, FY 1992-1997	III-6
-5	Federal Telecommunications Professional Services Market Forecast, FY 1992-1997	III-7
-6	Federal Professional Services by Submode, FY 1992-1997	III-8
-7	Federal Telecommunications Market Forecast for Defense and Civilian Agency Expenditures, FY 1992-1997	III-10
-8	Leading Leased Telecommunications Users	III-12
-9	Technology Impact on Federal Telecommunications	III-15

## IV

-1	Key Federal Agencies in Regulation, Standards, Policy	IV-1
-2	Preferred Method for Acquiring New or Improved Telecommunications	IV-10
-3	Federal Telecommunications Spending Directions	IV-12
-4	Percentage Distribution of Telecommunications Traffic	IV-12
-5	Agency Consideration of Third-Party Network Management	IV-14
-6	Agency Use of Integrated Network Services	IV-16
-7	Importance of VSATs and Satellite Systems	IV-17
-8	Agency Importance Ratings of Network Applications	IV-18

## Exhibits (Continued)

### IV

-9	Effectiveness of Telecommunications Use	IV-22
-10	Driving Forces	IV-23
-11	Inhibiting Factors	IV-24
-12	Vendor Weaknesses	IV-24
-13	Agency Recommendations to Vendors	IV-26

### V

-1	Expected FTS 2000 Effectiveness	V-9
-2	Networks Used to Meet Agency Data Network Requirements	V-10
-3	Vendor Perception of Federal Government's Effective Use of Telecommunications Systems and Services	V-11
-4	FTS 2000 Impact on Vendor Marketing	V-12
-5	FTS 2000 Effectiveness Through 1995	V-13
-6	Vendor Perception of Market Inhibiting Factors	V-13

### VI

-1	Leased Telecommunications—Percent Single versus Bundled Contracts, 1990	VI-2
-2	Leased Telecommunications—Top Three Other Products/Services, 1990	VI-3
-3	Telecommunications Equipment—Percent Single versus Bundled Contracts, 1990	VI-4
-4	Telecommunications Equipment—Top Three Other Products/Services, 1990	VI-5
-5	Telecommunications Technical Support—Percent Single versus Bundled Contracts, 1990	VI-6
-6	Telecommunications Technical Support—Top Three Other Products/Services, 1990	VI-6
-7	Telecommunications Maintenance—Percent Single versus Bundled Contracts, 1990	VI-7
-8	Telecommunications Maintenance—Top Three Other Products/Services, 1990	VI-8
-9	Top 10 Vendors—Total Telecommunications Market, 1990	VI-9
-10	Top Four Vendors and Market Shares—Leased Telecommunications, Fiscal Year 1990	VI-10
-11	Top Four Vendors—Leased Telecommunications Single/Bundled Revenues, FY 1990	VI-11
-12	Top Four Vendors and Market Shares—Telecommunications Equipment, Fiscal Year 1990	VI-13
-13	Top Four Vendors, Telecommunications Equipment—Single/Bundled Revenues, FY 1990	VI-14
-14	Top Five Vendors and Market Shares—Telecommunications Maintenance, Fiscal Years 1987-1988	VI-16

## Exhibits (Continued)

### VI

<b>-15</b>	Top Five Vendors, Telecommunications Maintenance— Single/Bundled Revenues, 1987-1988	VI-17
<b>-16</b>	Top Five Vendors and Market Shares Telecommunications Technical Support, Fiscal Years 1987-1988	VI-18
<b>-17</b>	Top Five Vendors, Telecommunications Technical Support—Single/Bundled Revenues, 1987-1988	VI-19
<b>-18</b>	Vendor Perception of Federal Telecommunications Market Directions	VI-20
<b>-19</b>	Vendor Perceptions of Market Growth Factors	VI-21
<b>-20</b>	Agencies Offering the Most Telecommunications Opportunities	VI-22
<b>-21</b>	Vendor Perceptions of Agency Preference for Acquiring Telecommunications Systems and Services	VI-23
<b>-22</b>	Vendor Ranking of Criticality of Telecommunications Technologies	VI-25
<b>-23</b>	Vendor Suggestions to Improve Responsiveness to Federal Telecommunications Needs	VI-28
<b>-24</b>	Significant Factors That Will Affect Federal Use of Telecommunications Services through 1997	VI-29
<b>-25</b>	Government Actions to Use Telecommunications More Effectively	VI-30
<b>-26</b>	Recommendations to Vendors	VI-31

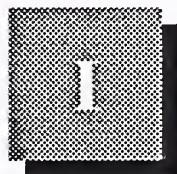
### Appendixes

#### C

<b>-1</b>	Information Services Industry Structure	C-6
-----------	---	-----







# Introduction

INPUT prepared this revised report on telecommunications systems and services in the federal government as part of the Federal Information Technology Market Program (FITMP).

Research for this revision is based on new analysis of the INPUT Procurement Analysis Report (PARs), and previous INPUT research for reports prepared in 1986, 1987, 1988, and 1990. Additional research included reviews of federal procurement documents, review of federal information technology budget plans, and analysis of current issues in the trade press.

## A

### Scope

---

Analysis in this report addresses telecommunications system and services programs listed in the OMB/GSA Five-Year Plan for government fiscal years (GFYs) 1992-1997, related long-range information resource plans, and federal agency GFY 1991 and 1992 information technology budgets.

Earlier versions of the *Federal Telecommunications Market* report included data gained through interviews with government and vendor personnel. Applicable elements of the interview data have been retained for the 1992 version.

Agencies selected for new interviews include those that currently use telecommunications services or products. Contractors who were active in federal telecommunications programs or are listed as vendors of telecommunications services or products in INPUT's Vendor Analysis Program data base for 1992 made up the list of vendors INPUT selected for interviews.

---

**B**

---

**Methodology**

INPUT analysts reviewed the OMB/GSA Five-Year Plan and the INPUT Procurement Analysis Reports for communications programs initiated during government fiscal years 1992-1997.

INPUT also examined agency A-11 submissions for fiscal years 1991 and 1992 for additional information on communications requirements embedded in distributed data processing and office automation programs.

The available agency long-range ADP plans for GFY 1991-1995 and 1992-1996 were also reviewed to identify plans for forthcoming major telecommunications systems and services contracts.

For both previous and current versions of the *Federal Telecommunications Market* report, INPUT developed questionnaires for interviewing federal agency officials and telecommunications vendor executives. The agency questionnaire was designed to obtain information about plans for future use of telecommunications systems and services.

The vendor questionnaire was designed to obtain information about current and future plans from major vendors of telecommunications products and services. Both questionnaires included similar questions about contracting policy and preference, technical standards, and vendor performance perceptions. Copies of the agency and vendor (industry) questionnaires are included in Appendix G.

Federal agency officials selected for interviews included executives (policymakers) and program managers (users). Vendor representatives selected for interviews included company executives and high-ranking marketing personnel.

---

**C**

---

**Report Organization**

Following this introduction, the report is divided into five sections.

Chapter II—Executive Overview—summarizes the major points and findings in the report.

Chapter III—Market Analysis and Forecast—includes INPUT's analysis of the telecommunications sectors of the Federal Information Technology Budget for fiscal years 1992 through 1997.



This chapter also addresses major market factors, agency forecasts, and vendor shares in various market segments.

Chapter IV—Agency Requirements—provides commentary on key regulation and policy agencies and on agency plans for acquiring telecommunications systems. The chapter also includes a discussion of current standards, protocols, and compatibility issues in the federal telecommunications market.

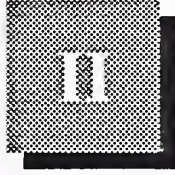
Chapter V—Implications of FTS 2000—provides a summary of FTS 2000 services and analyzes agency interests and concerns about FTS 2000.

Chapter VI—Competitive Trends—provides analysis of the competitive environment in three key telecommunications market segments. This chapter also identifies the top five market leaders in each segment, and reviews the product mix in major federal contract awards over the past two years.

Several appendixes are also provided:

- Interview Profiles
- Telecommunications Opportunities
- Definitions
- Glossary of Federal Acronyms
- Policies, Regulations, and Standards
- Related INPUT Reports
- Questionnaires





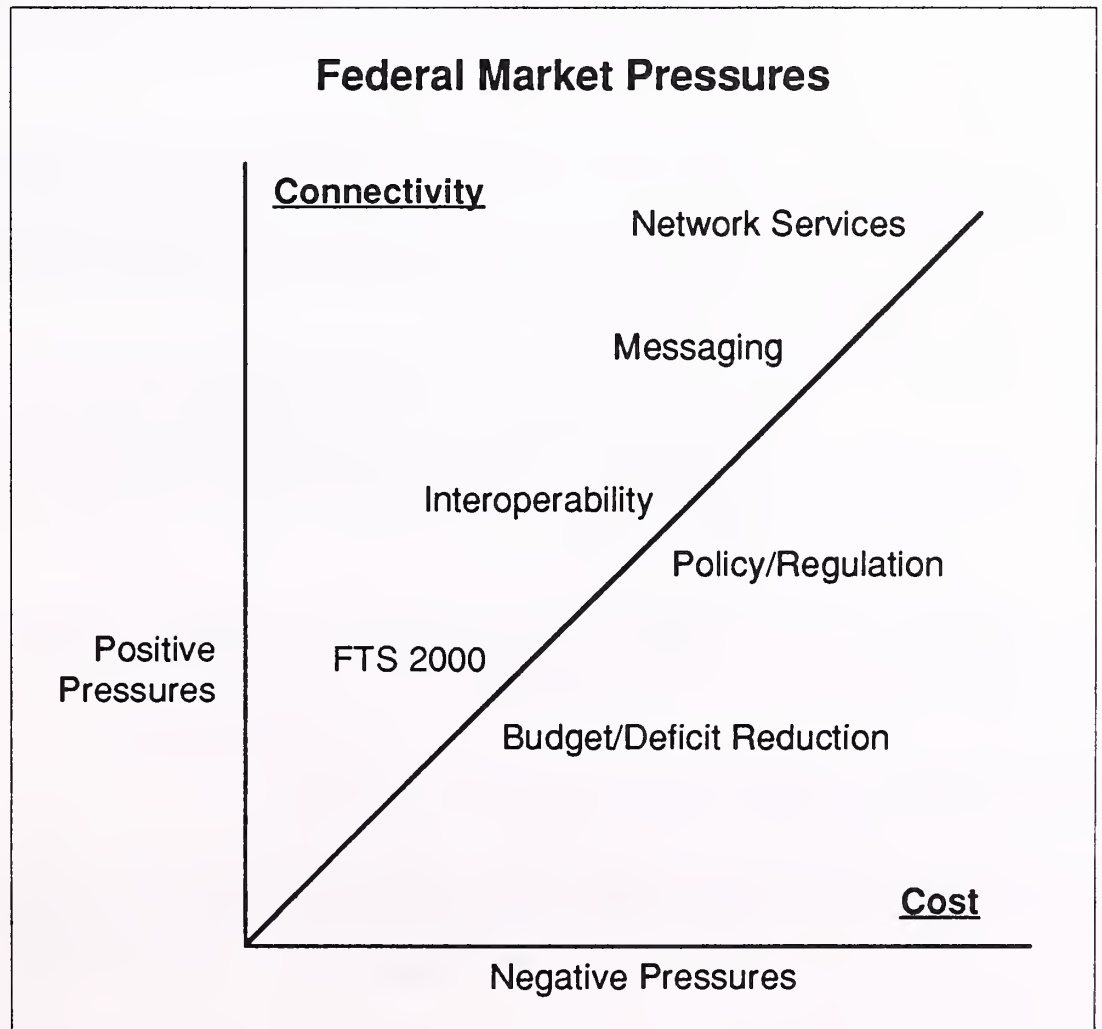
## Executive Overview

### A

#### Federal Market Pressures

The federal market for telecommunications products and services is buffeted by two conflicting forces. Increasing demand for connectivity solutions is exerting a strong positive pressure. The positive pressure is being counteracted by strong negative pressures related primarily to cost. Exhibit II-1 summarizes the key positive and negative pressures.

EXHIBIT II-1



On the positive side, the availability of FTS 2000 represents a strong pressure. Agencies and departments that had been holding plans in abeyance while FTS 2000 was being contracted and implemented are now moving forward. While FTS 2000 continues to evolve, agencies are making use of features and services not previously available.

The ability to interconnect disparate devices and systems is also creating positive pressure. With GOSIP now the agreed-upon standard, agencies are expected to show increasing interest in standardized products and services.

In addition to network-based pressures (FTS 2000) and physical/logical connectivity pressures (interoperability), agencies and departments are increasingly interested in messaging services such as E-mail and electronic commerce (EC) that will increase the reliability and speed of communications.

One driving force in network services is the increasing need for electronic information services (EIS) to access a wide variety of on-line data bases. A smaller but rapidly growing component of network services is the use of network applications.

Positive pressures are counteracted by two major forces. The first is the demand for budget/deficit reduction and policies that make connectivity more difficult to achieve.

Budget/deficit reduction considerations will continue to impact agencies' ability to implement modern telecommunications technology. Planners must continue to make compromises between solutions that will provide a base for future growth and needs to meet current requirements with increasingly limited funds.

Policies/regulations that necessitate lengthy acquisition processes can delay the implementation of productivity-enhancing telecommunications technology. In addition, policies that mandate specific standards, such as GOSIP, will exert a negative pressure due to the limited variety of certified products.

Overall, positive pressures are expected to outweigh the negative pressures, since timely and effective communications are a growing need.

## B

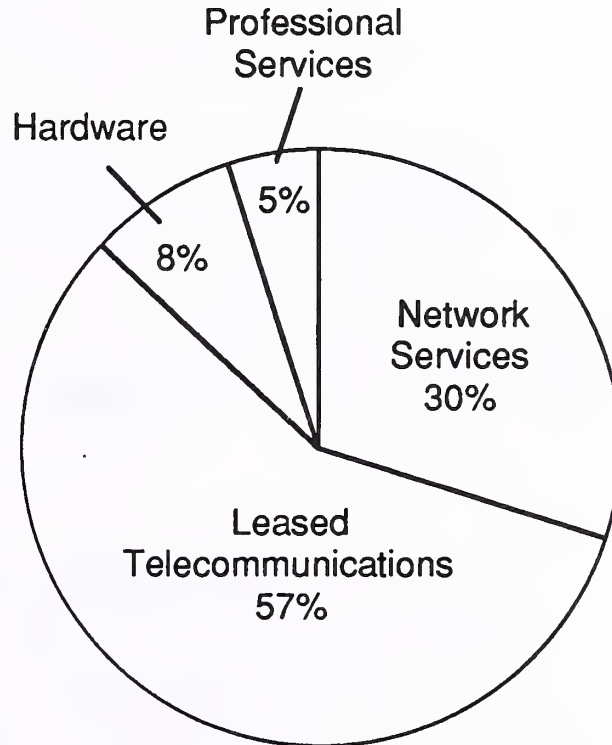
### Federal Telecommunications Market Segments

---

This market forecast focuses on several specific types of telecommunications systems and services commercially acquired by the federal government, as shown in Exhibit II-2.



## EXHIBIT II-2

**Federal Telecommunications  
Market Segments, 1992**

- Leased telecommunications services, including common carrier connections, local-area and wide-area network services constitute about 57% of telecommunications services procurement.
- Hardware, such as cabling, switching equipment, and satellite ground stations, account for about 8% of annual expenditures.
- Professional services, such as network design, network management, installation, and equipment maintenance represent approximately 5% of outlays.
- Network services, such as value-added (packet switch) networks, E-mail, and electronic commerce services represent approximately 30% of expenditures. Network services also includes access to public data bases to obtain information for analysis.

The forecast also includes some telecommunications hardware and services acquired as part of other information technology programs, such as office automation and information systems, distributed data processing, and both C2 (Command and Control) and C3 (Command, Control, and Communications) acquisitions.

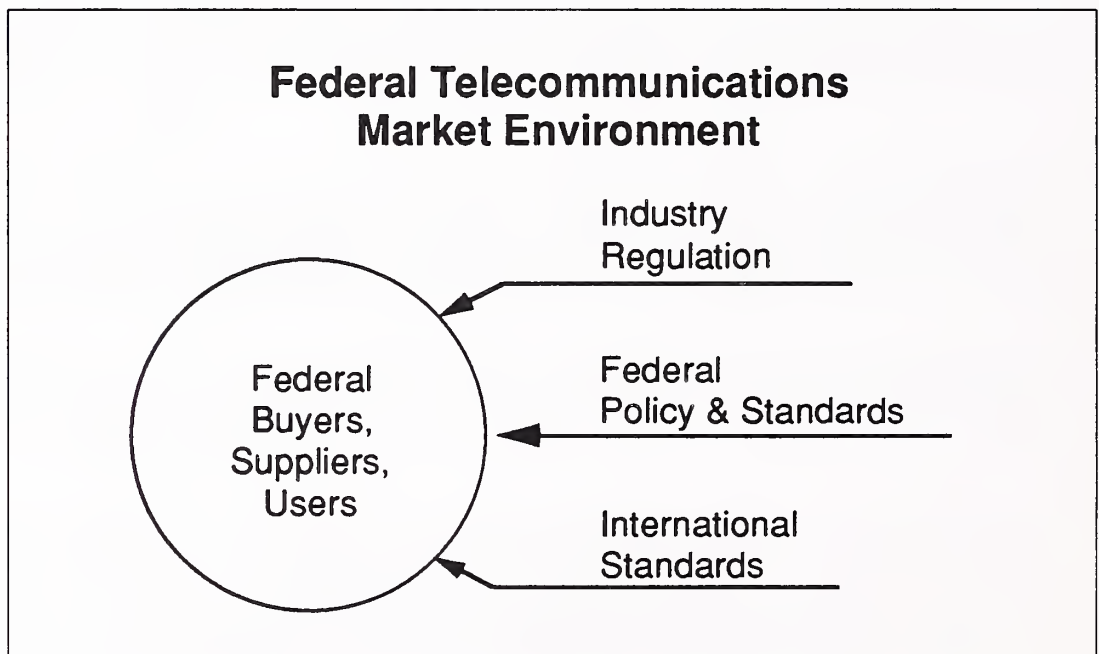
Local telephone service and the communications components of many intelligence and defense tactical/weapons systems are funded by the government outside of agency information technology budgets and consequently fall outside the scope of this market forecast.

## C

### Market Environment

The federal telecommunications market is shaped by procurement activities of the agencies and by a variety of regulatory, policy, and standards influences, as shown in Exhibit II-3.

EXHIBIT II-3



Most federal agencies are both buyers and users of telecommunications systems and services. Several agencies, however, function primarily as buyers or resuppliers of telecommunications resources for other agencies.

- GSA, through the FTS 2000 WITS
- Defense Information Systems Agency (DISA)—formerly Defense Communications Agency (DCA)
- U.S. Army as executive agency for DoD
- U.S. Air Force and DoD executive agency
- Defense Commercial Communications Office (DECCO)

Other federal agencies influence the market primarily through regulation, policy, and standards activities. These agencies include the FCC, NCS, NTIA, NIST, OMB, and NSA. Since federal telecommunications access extends outside the government and across international boundaries, the market also is subject to external pressures from:

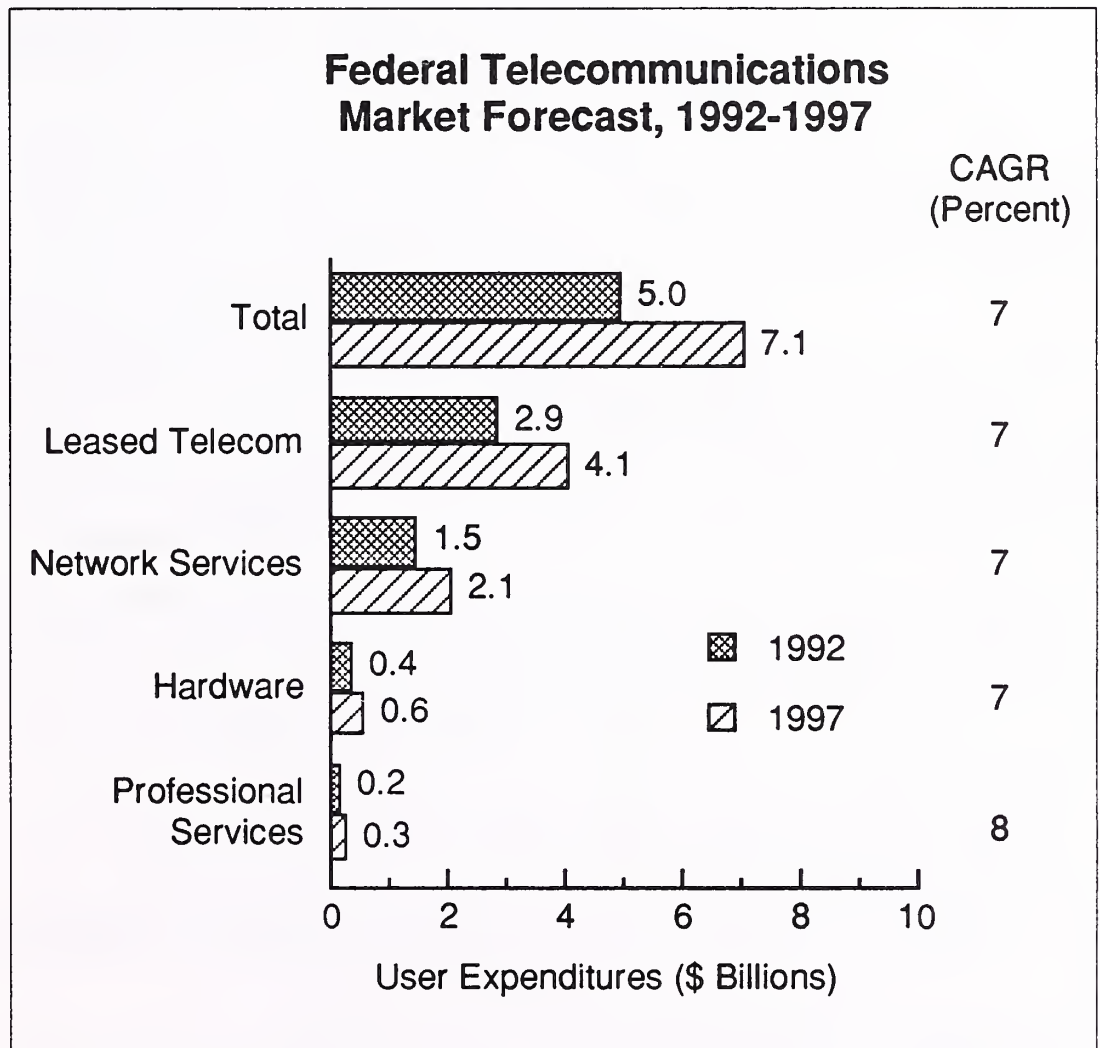
- International organizations such as CCITT, ISO, and the ITU
- National industry organizations as NATA and ANSI
- PTTs in foreign countries

## D

### Market Forecast, 1992-1997

INPUT estimates that the federal government telecommunications market will increase from \$5.0 billion in FY 1992 to \$7.1 billion in FY 1997 with a compound annual growth rate of 7%, as illustrated in Exhibit II-4.

EXHIBIT II-4



The overall market size continues to grow and the growth rate is approximately the same as earlier forecasts. Unlike virtually every other category tracked by INPUT, telecommunications spending by Defense agencies accounts for more than half of the federal total. Thus, additional budget cuts resulting from what is commonly called "the peace dividend" could lower the growth rate of telecommunications.

Spending on network services has grown considerably. In the past year, several agencies have announced initiatives, many of them documented in INPUT's PAR data base for both value-added networks (VANs) and EC applications.

Finally, FTS 2000 is exerting conflicting pressures on the federal market. On the one hand, prices (at least for voice services) are lower, reducing agency costs. Also, the traditionally high charges for data transmission are being reduced. On the other hand, the enhanced capabilities of FTS 2000 are beginning to stimulate latent demand among many agencies for new services and features.

Professional services, although representing a small part of the market, will exhibit the highest growth, with a compound annual growth rate of 8%.

## E

### Technical Trends

FTS 2000 has been implemented and accepted by most agencies. With the adoption of GOSIP, connectivity and interoperability standards are becoming clearer.

#### EXHIBIT II-5

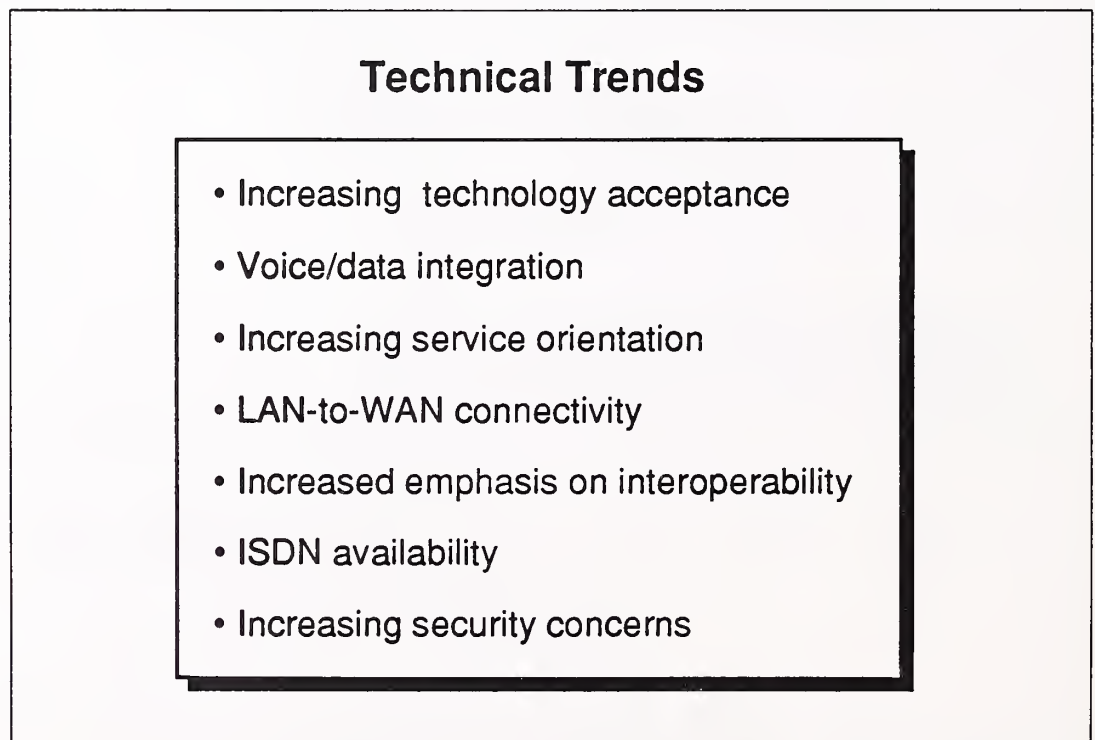


Exhibit II-5 outlines the expected technical trends.



New technology acceptance is beginning to grow. Greater acceptance is expected over the next five years. However, initial focus will be on capabilities such as the integration of voice and data. Agencies are expected to begin the integration process through basic capabilities provided by FTS 2000. This is the same approach taken by the private sector. A few agencies require advanced technologies not yet available through FTS 2000.

Although the private sector may have a greater availability of funds, it is equally cautious about committing to technology that changes quickly and could lock buyers into a technological approach for an extended period. With extended procurement and life cycles, the federal sector will be equally cautious, giving preference to proven technology and services.

A general lack of staff expertise will cause agencies to increase their emphasis on single sources of supply where possible. This will tend to drive agencies toward use of services such as FTS 2000. Agencies will also be driven toward the use of integrators that are able to deliver complete solutions. FTS 2000 will continue to expand the scope of available services and technologies.

LAN and LAN-to-WAN connectivity is a growing need for agencies, as it is in the public sector. With many basic needs being met through FTS 2000, agencies will place increased emphasis on connecting their large numbers of disparate LANs. LAN interconnection will be accompanied by connection of LANs to wide-area networks such as FTS 2000.

With growing network connectivity, interoperability will be a growing necessity. With a wide range of system standards already in place, agencies are expected to look for services, hardware, and software that will permit greater communication between systems.

As it does in the private sector, ISDN remains an enigma to federal agencies. Agencies recognize the benefits of being able to integrate voice, data, text, and video, but are unable to clearly identify specific services that relate to their needs. Though this should change over the next few years, most agencies continue their wait-and-see approach to ISDN.

Federal agencies are growing more concerned about telecommunications security and are requiring end-to-end encryption even for systems that handle nonsensitive information. Passage of the Computer Security Act has heightened this concern.

**F****Issues and Problems**

Federal agencies and the private sector organizations experienced similar problems entering the post-divestiture era, as shown in Exhibit II-6. The government encountered more and greater problems because it is the world's single largest customer for commercial telephone service. Although most service problems have now been resolved, several issues remain. A primary one is the scope of service to be provided by the Regional Bell Operating Companies (RBOCs).

**EXHIBIT II-6****Agency Problems and Issues**

- Local (RBOC) services
- Budget constraints
- Reorganization and staff shortages
- Technological complexity
- Procurement processes and problems

Agencies continue to express growing concern over budget reductions. The impact on telecommunications programs may be mitigated, however, by cost trade-offs between actual travel and "travel by telecommunications." INPUT has observed that a more common problem is approved money not being spent.

Agencies remain unprepared for the staffing impacts of divestiture and FIRMR-mandated integration of voice and data communications organizations. Agencies believe they cannot compete with the private sector to recruit scarce, highly qualified telecommunications specialists. This problem is not limited to telecommunications areas. Rather, it pervades virtually all highly technical areas in the government. This problem represents an obvious opportunity for contract service providers.

The need to integrate systems and networks has significantly increased the complexity of systems and networks. Agencies, already constrained by inability to attract a wide range of technical expertise, must increasingly contend with systems and networks that are interconnected, interoperable, secure, and provide a free flow of data and information.

Bidder protests and congressional investigations have substantially changed the bidding conditions and award schedules. As a result, agencies are increasingly inclined to use approved facilities and services, such as FTS 2000, except in cases where there is an overriding need for separate networks.

## G

### Leading Agencies

---

Although all federal agencies buy some commercial telecommunications systems and services directly, the annual procurement by DoD represents a substantial portion of the total telecommunications expenditures.

Most of the major new telecommunications initiatives from FY 1992 through FY 1997 come from DoD and GSA.

- Defense communications (DISA) will continue its evolution to the Defense Data Network (DDN), the Defense Switched Network (DSN), and the FTS 2000 system. New initiatives will include the WAM program and projects to integrate LANs and connect LANs with WANs. The recent Desert Shield/Storm operations verified the need and value of the newer telecommunications capabilities.
- On the civilian side of the federal government, GSA will continue its telecommunications initiatives by expanding and enhancing FTS 2000 capabilities. GSA will also be placing greater attention on LAN connectivity requirements, continuing to structure umbrella contracts that provide standardized solutions. Through these network initiatives, GSA expects to be able to provide a significantly enhanced infrastructure within which agencies will be able to meet their needs.

The major federal telecommunications buyers'/suppliers' projects are listed in Exhibit II-7.



## EXHIBIT II-7

**Leading Federal Telecommunications  
Buyers/Suppliers**

- Defense
  - DISA (\$1.3 billion)
  - WAM
- GSA
  - FTS 2000
  - LAN connectivity

**H****Competitive Outlook**

AT&T is fighting to retain its dominant market position. The success of US Sprint on FTS 2000 has changed the market structure. AT&T has been successful as a team member in several recent new network procurements. However, AT&T is being challenged by a variety of firms seeking specific market niches in the government.

Aside from the provision of local service, the Regional Bell Operating Companies (RBOCs) may not be a significant force in the federal market during the next several years. The RBOCs will be largely limited to providing service within their own LATAs. The exception will be the unregulated portion of some RBOCs which are becoming increasingly aggressive in providing niche products and could begin providing gateway services in localized geographic areas. INPUT believes that the provision of gateway services will become increasingly liberalized over the forecast period.

In June 1991, the U.S. Senate voted to let the RBOCs manufacture phone equipment, which would put them in competition with AT&T. An equivalent House bill has not yet been passed. It is expected that RBOCs will subsequently also distribute equipment, software, and subsystems from other manufacturers.



The battle to allow the RBOCs to enter the information services industry has been joined. In July 1991, Judge Greene modified his ruling to allow them into information services. The real fight will be waged in the halls of Congress. The RBOCs are being opposed by information services companies, cable TV operators and a powerful newspaper publishing lobby. Various legislation has been proposed on both sides of the issue. At the time of this report, if Congress does nothing to limit the RBOCs, they are free to provide all types of information services.

FTS 2000 will represent the dominant delivery infrastructure for the next several years. With integration becoming increasingly important, the greatest competition will be for products and services that provide connectivity to FTS 2000. Of these, the greatest needs will be for connectivity solutions to permit LAN and office systems access to FTS 2000.

Vendors will need to place increased emphasis on establishing alliances with US Sprint and AT&T, the current FTS 2000 providers. Though each is a strong organization, with broad ranges of products and services, there are opportunities to provide specific products and services to meet agencies' needs. Neither organization can meet all the requirements of all departments and agencies.

The window of opportunity for smaller telecommunications companies is closing quicker than it did for their counterparts in ADP systems and services. The two-prime-contractor approach mandated for FTS 2000 and the increasing preference shown by federal agencies for systems integration vendors could lock out smaller vendors that do not have close ties to established prime vendors in the federal market.

Many firms and trade associations continue to exert heavy pressure on Congress and GSA to limit the scope of FTS 2000. INPUT does not believe they will be successful. Congress and GSA have emphatically made FTS 2000 a mandatory contract. GSA has eagerly added new services and offerings to the contract. Only a successful legal challenge could stop this trend. The competitive outlook is detailed in Exhibit II-8.

## EXHIBIT II-8

**Competitive Outlook**

- AT&T less dominant
- Niche markets important
- FTS 2000 alliances
- Increased services/support
- Increased systems integration

**I****Recommendations**

All telecommunications vendors need to invest more effort in understanding agency missions and communications requirements. This understanding may be difficult to achieve, yet will be a key factor in successful bids for agencywide telecommunications systems that support more than one mission.

Since the government continues to experience a shortage of telecommunications expertise, vendors can improve their prebid positions by providing education, technology forecasts, and planning guidelines through high-level briefings and meetings with federal officials. This marketing effort, as opposed to selling, is a critical element in enhancing federal presence.

Vendors need to provide total telecommunications solutions, including pre-implementation planning and post-implementation service. Agency officials frequently voiced concern over vendors, particularly in the hardware area, that provided inadequate support after installation. As a result, federal buyers are placing increased emphasis on corporate stability and reputation for services.

Vendors must move quickly to establish a viable market presence in federal telecommunications. Though the growth of network services will create opportunities, vendors that have not created visibility about their presence and the value of their products will lose market position.

Finally, those vendors not included in the two FTS 2000 contract teams should continue to seek niche markets on the periphery of the FTS 2000 contracts. They should also work with agencies to try to limit the scope of contracts where possible. Exhibit II-9 lists INPUT's recommendations.

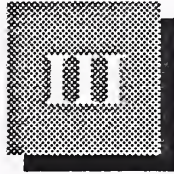
## EXHIBIT II-9

**Recommendations**

- Understand agency requirements
- Increase marketing, reduce sales
- Emphasize total solution and service
- Establish market position
- Seek FTS 2000 alliances







## Market Analysis and Forecast

Although the federal telecommunications market has shown signs of increasing volatility, INPUT continues to believe that it will show sustained growth well into the 1990s.

However, while spending will continue to grow, the number of distinct opportunities will probably decrease. Growth in some segments of the market will level off. This will be offset by new growth in other market segments.

This section of the report presents INPUT's forecast for growth of the federal telecommunications market. It analyzes individual market segments, the competitive environment, and the potential effects of federal policy and regulation during the forecast period.

### A

---

#### Federal Market Forces Through 1997

There are a number of forces listed in Exhibit III-1 that will drive the federal telecommunications market over the next five years. While some areas and agencies will grow fairly slowly, others will experience very sharp increases in growth.

INPUT believes that the effects of budget constraints will be mitigated somewhat in the federal telecommunications market. Budget reductions actually may increase federal dependence on telecommunications services. Teleconferencing and electronic message distribution will be emphasized to reduce travel and other costs.

## EXHIBIT III-1

**Major Federal Telecommunications  
Market Impacts**

- Budget and deficit reduction
- Policy and regulation
- FTS 2000
- Interoperability
- EC/E-mail
- Technological advances
- Vendor competition

Agency network service contracts typically last seven to ten years; current contracts will not be terminated because of budget constraints. New and replacement network acquisitions, however, may be deferred if agencies can meet their telecommunications requirements through existing federal resources.

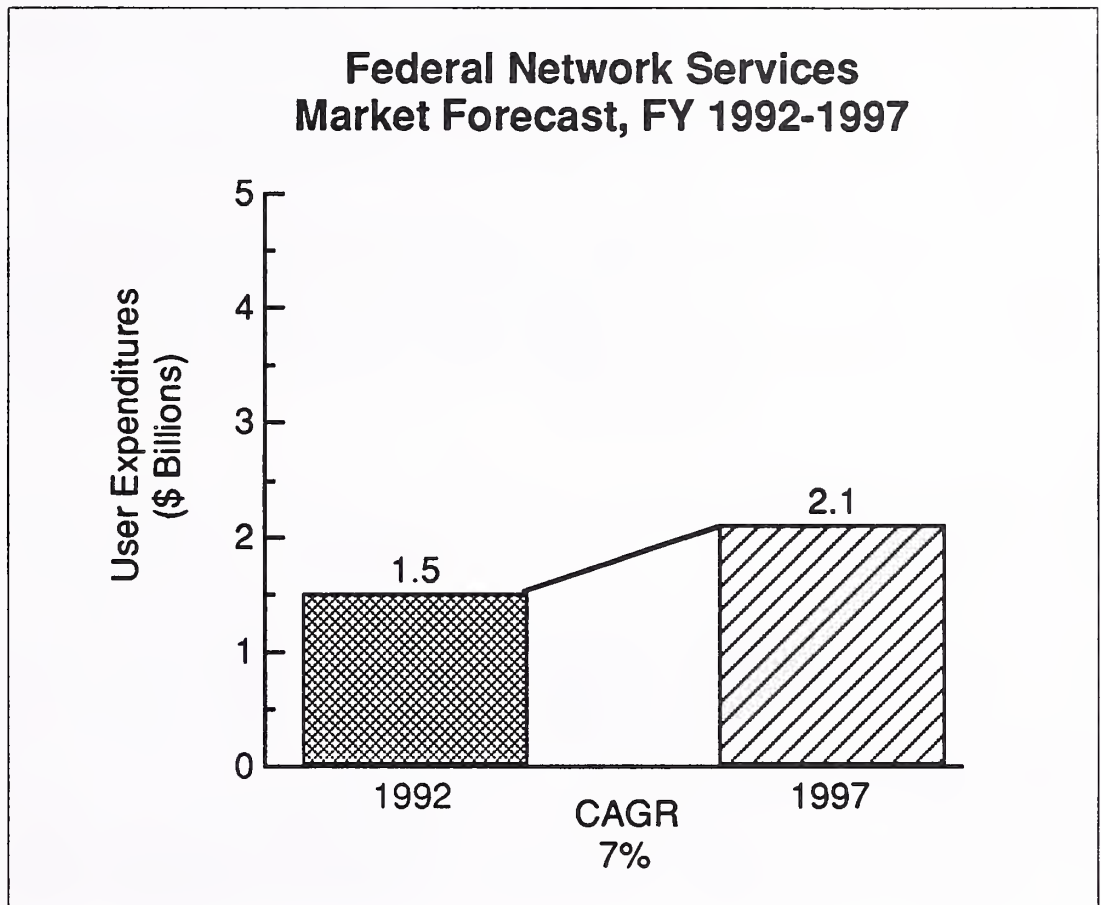
Advanced networking services of FTS 2000 and Defense Data Network will stimulate increased use of network services. INPUT believes that the relationship between voice and network services could begin to shift over the next five years. FTS 2000 is currently used about 17% for non-voice services. Today, voice services represent an estimated 60% of all leased telecommunications expenditures. Network-based services account for 40%. Near the end of the five-year period, this will begin to reverse.

With the emphasis on networking products and services, interoperability will be an increasing requirement. Hardware and software that support network and system connectivity requirements should be in high demand.

Although it currently lags behind the explosive commercial growth, electronic commerce (EC) will still grow sharply. This will drive up telecommunications traffic and network service requirements, reducing agency personnel requirements. As more computers tie in directly with their federal counterparts, the volume of information exchange will continue to grow.

INPUT expects the network services market segment to grow from \$1.5 billion to \$2.1 billion between FY 1992 and FY 1997, at a CAGR of 7%. This is illustrated in Exhibit III-2.

## EXHIBIT III-2



This segment includes some declining components exemplified by the network usage of remote computing (time-sharing) and X.25 data networks. The segment also includes growth areas like access to on-line data bases, E-mail, electronic commerce, and networked applications. As in the private sector, the government has a growing need to collect and disseminate data, textual, graphic, and image information throughout organizations. This is particularly true for geographically dispersed organizations.

An expanded definition of this market segment combined with the identification of additional applicable programs and procurements led to a substantial increase in this market segment over the previous 1990 report.

Some other factors will drive the federal telecommunications market:

- Agencies will become more demanding and sophisticated in their telecommunications requirements, initiating their own requirements-type contracts for items outside the scope of FTS 2000.
- Technological advances will change the market character. For example, as better network management tools become available, agencies will come to expect the resulting economies and efficiencies.

- Communications security requirements will increase as a result of the Computer Security Act.
- Further, security considerations will restrict interaction between local-area networks in DoD, at least in the near future.

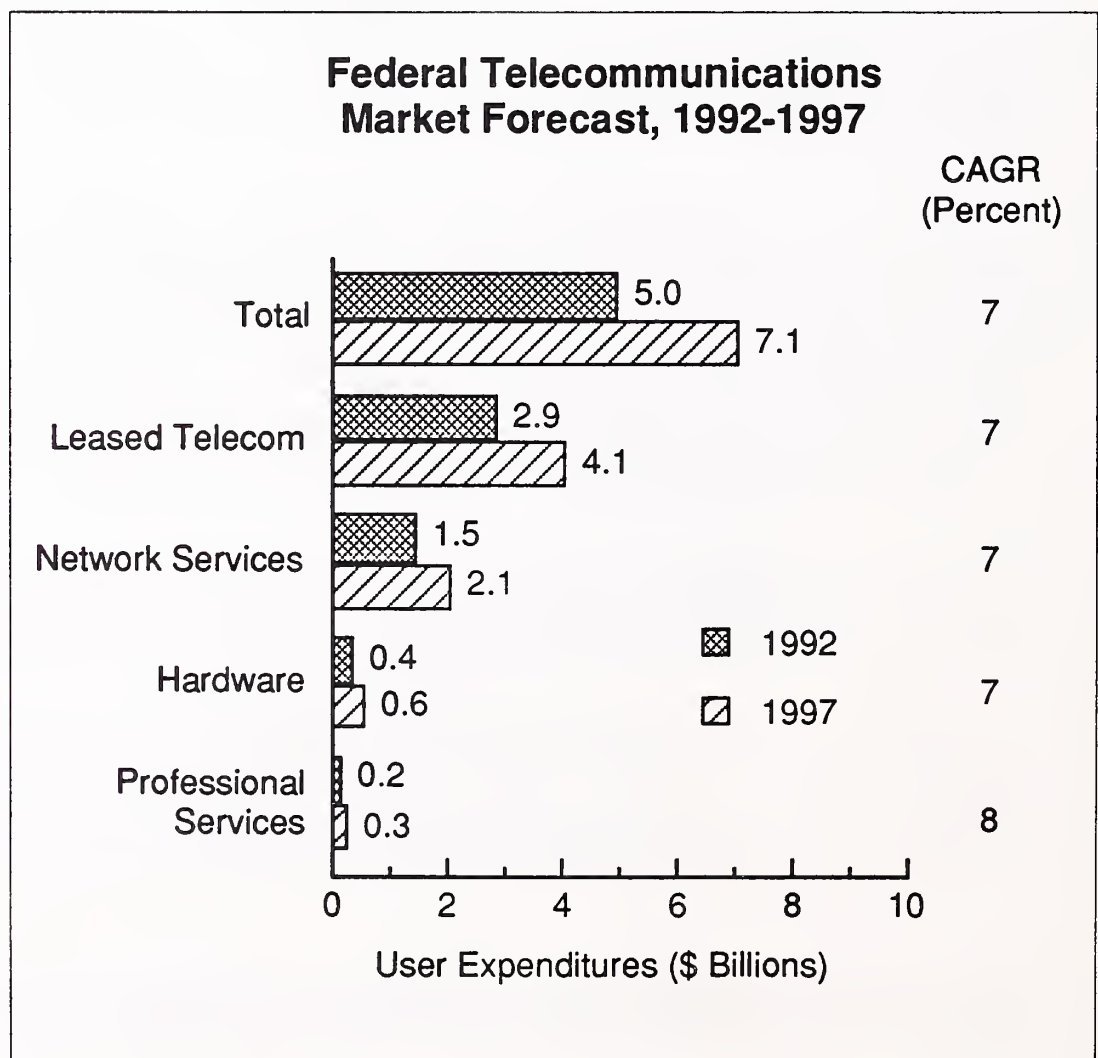
Overall, with basic needs satisfied through FTS 2000, competition for add-on and support products and services will become increasingly intense. However, vendors that can provide strong support for unique or niche products and services can find a wider range of opportunities than might be expected.

## B

### Market Forecast

INPUT expects the federal communications and network services market to grow from \$5.0 billion in FY 1992 to \$7.1 billion in 1997. This represents a compound annual growth rate of 7%, as shown in Exhibit III-3.

EXHIBIT III-3





This market forecast combines several of the commercially defined systems and service modes described in Appendix C. Leased telecommunications include both leased networks and transmission facilities. Network services includes value-added network services such as electronic information services (EIS), network applications, packet switching, E-mail, and EC. Network services also includes the use of on-line data base services. For a complete description of this market segment, refer to INPUT's report, *U.S. Network Services Market, 1991-1996*. The hardware category includes both communications devices and computer systems that support telecommunications services. The professional services category includes four elements:

- Consulting
- Education and training
- Programming and analysis
- Network management

The large percentage of the market attributed to leased telecommunications services (57% in FY 1992 and 1997) tends to obscure some important trends in the smaller segments. Although a small percentage of the total, professional services exhibits the highest growth rate. This growth is attributable to the growing requirements for professional expertise to develop strategies to integrate increasingly complex networks and systems. This is also discussed below.

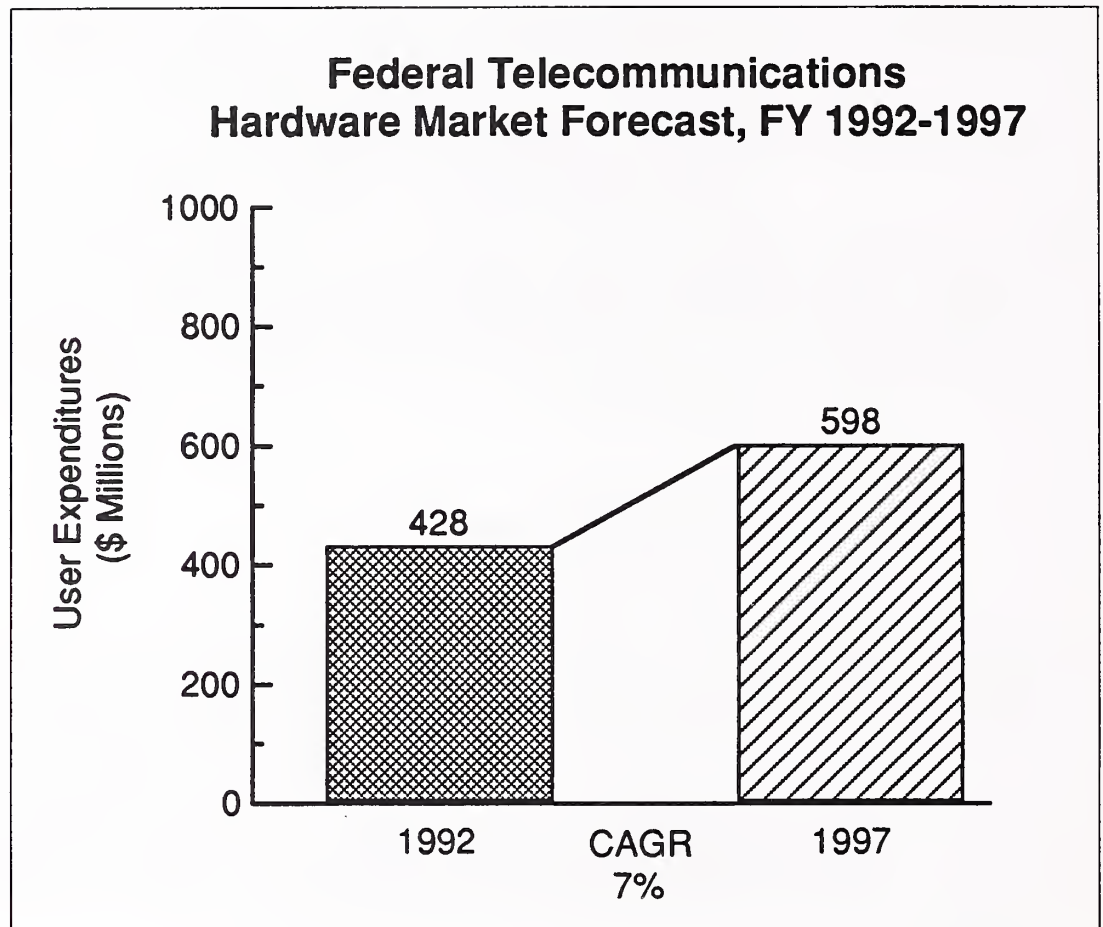
INPUT expects the telecommunications equipment market, shown in Exhibit III-4, to grow at a rate nearly equal to the overall market.

In the 1988 report, INPUT had forecast a market for telecommunications hardware of approximately \$365 million for 1992. In the 1990 report, the forecast for 1992 was increased to \$660 million. INPUT now places the 1992 market forecast at \$428 million.

There are several factors that account for this fluctuation in the market forecast.

- Often telecommunications equipment purchases are embedded in other integrated acquisitions, making them difficult to identify and quantify.
- Changes in a single very large program can have an impact on the overall market forecast.
- Technological advancements and price erosions have occurred faster than previously forecast.

## EXHIBIT III-4

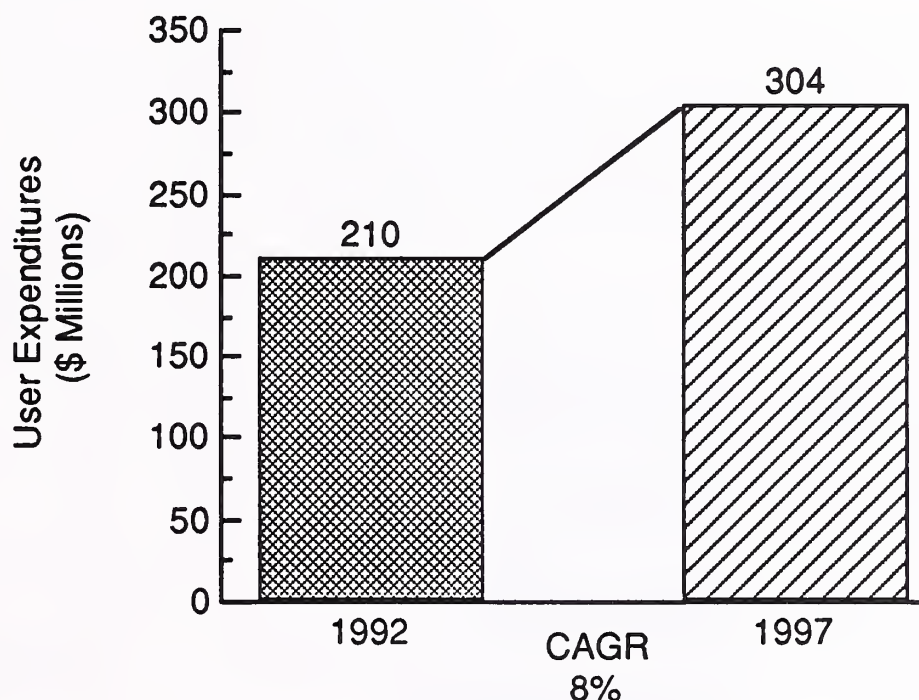


- There has been significant growth in LANs and products to connect LANs together. This is expected to continue.
- With FTS 2000 implemented, networking plans that were being held in abeyance are now being scheduled for implementation, either within FTS 2000 or given waivers to be constructed outside of the system.

INPUT estimates that the professional services segment of the federal telecommunications market will grow from \$210 million in FY 1992 to \$304 million in FY 1997, at a CAGR of 8%, as illustrated in Exhibit III-5. This growth rate is higher than the overall telecommunications growth rate shown in Exhibit III-3. However, the current year spending level is only 77% of that forecasted earlier, in 1990. The principal reasons for the lower spending rates in 1990-1991 are the delays that were enforced to permit full implementation of FTS 2000, and deletion of systems integration and systems operation components.

## EXHIBIT III-5

### Federal Telecommunications Professional Services Market Forecast, FY 1992-1997



There are several reasons that the growth rate for professional services is higher than the overall average.

- The combined effects of budget constraints on agency staffing and the shortage of in-house telecommunications expertise is expected to continue to contribute to the growth of professional services throughout the forecast period.
- Growth in the FY 1992 through FY 1997 timeframe also will be driven by agency acquisition of maintenance services for the recently acquired hardware.
- Network management has been identified as a new professional services market segment.

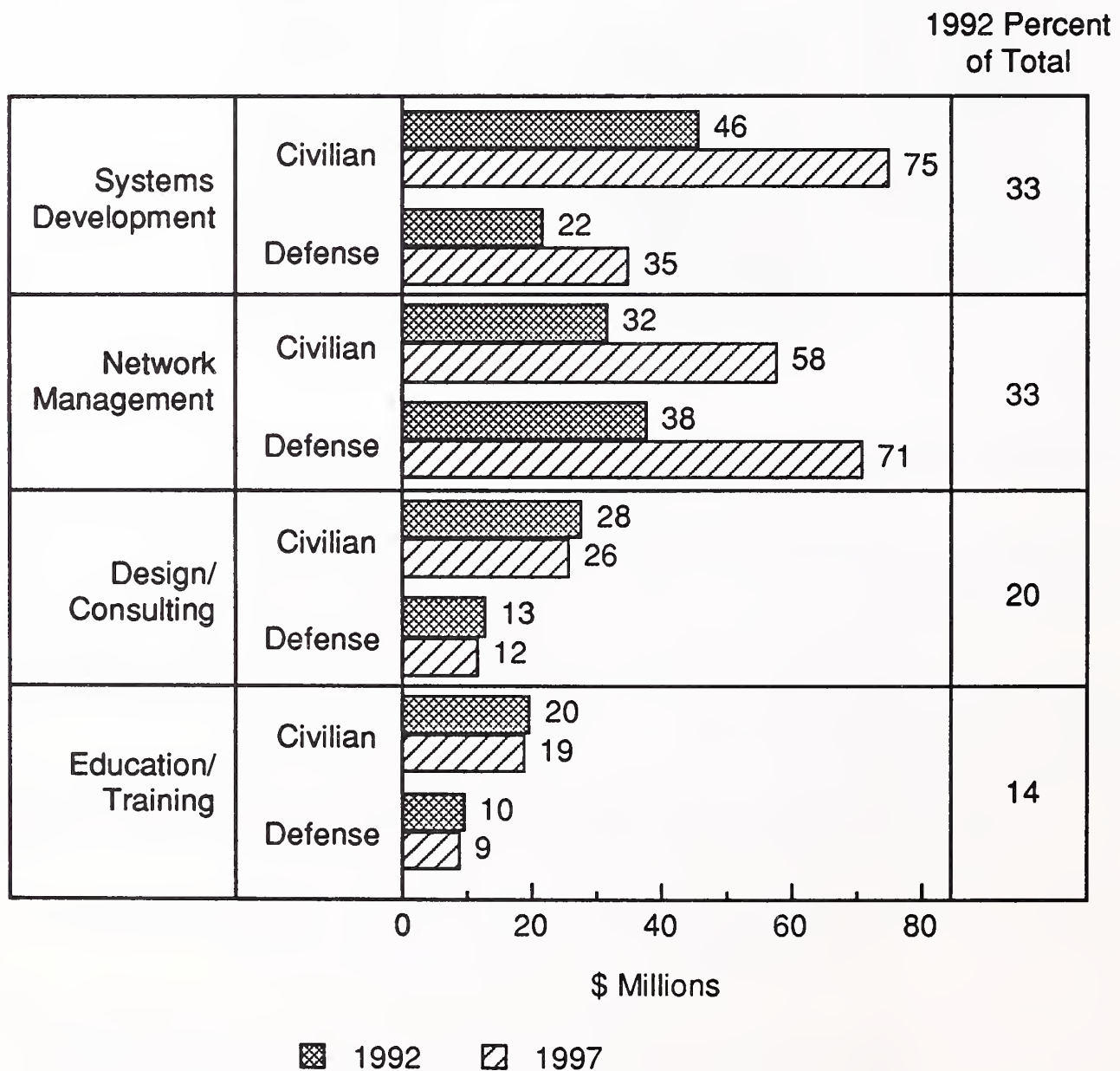
As in most other information technology areas, agencies are reducing their own technical activities in network planning and management. This is expected to continue, particularly with the assistance of AT&T and US Sprint, as FTS 2000 use grows. Agencies are procuring comprehensive solutions to their telecommunications needs.



Exhibit III-6 provides a breakdown of INPUT's traditional delivery mode for professional services. INPUT believes that analysis of these submodes provides a strong indication of the trends and directions of the federal telecommunications market over the next five years. There are several trends that are of particular note.

EXHIBIT III-6

### Federal Professional Services Market by Submode, 1992-1997





- For civilian agencies and the Defense Department, education and training currently represent only a small percentage of total telecommunications expenditures. This is not likely to change, and the proportional share could decline slightly. Education/training and design/consulting are being included as part of larger system development and systems integration contracts.
- Design/consulting is a small portion of professional services. The lower rate of growth is understandable. Design and consulting related to individual systems has given way to the complexity of large systems and the integration of systems and networks.
- Systems development is still a small portion of professional services and is expected to remain so. The growth rate is comparable to the rate for professional services because of the continuing need for new systems. This is not expected to change.
- Network management is a newly identified market segment. The federal network management market is still innovative. The market will grow slowly in the short term and will become more of an opportunity in the long term.

---

## C

### Agency Forecast

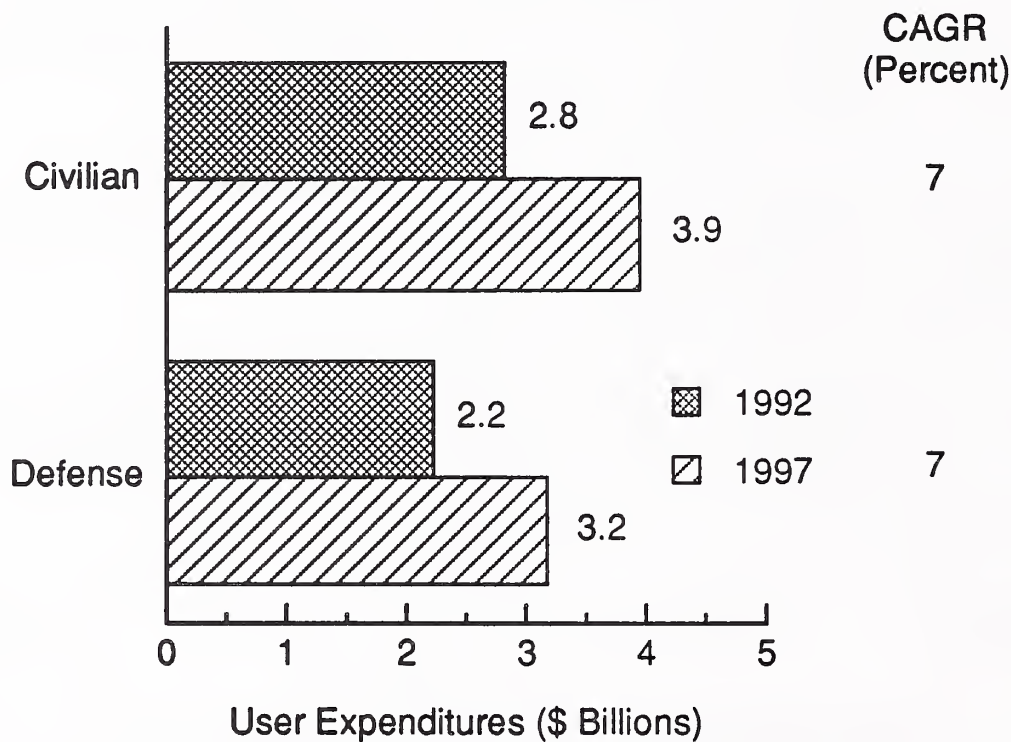
---

The federal telecommunications market forecast by agency is based on information from long-range plans, OMB A-11 submissions, the FY 1992 thru FY 1997 budgets of the United States, and interviews with agency officials responsible for telecommunications programs.

As shown in Exhibit III-7, INPUT estimates relatively equal growth in defense and civilian agencies' spending, with civilian expenditures representing the greatest proportion. Because of a shift of spending for FTS 2000 from DoD to GSA, these figures require more detailed analysis.

## EXHIBIT III-7

### Federal Telecommunications Market Forecast for Defense and Civilian Agency Expenditures, FY 1992-1997



#### 1. Special Defense Considerations

INPUT regards the defense telecommunications forecast as a conservative estimate of the defense market for commercial systems and services. Base or facility communications, which are not acquired through agency-wide programs, are usually not identified in agency information technology budget documents. This is particularly evident for telephone switching equipment that is not part of a command-wide acquisition.

Upgrades to base communications systems and local telephone service typically fall below budget reporting thresholds and may be funded through operation and maintenance budgets. Unclassified programs with a system life cycle cost of over \$25 million must be reported by the military departments in response to Congressional Armed Services Committee directives.

This new reporting limit represents a significant change, equaling the previous one-year limit set for MAISRC review. This reporting requirement will increase visibility of DoD spending. However, it should be noted that a significant amount of defense communications equipment funding is included in weapons programs and strategic systems. This funding is not regarded by DoD as part of the information technology budget.

## **2. Leased Telecommunications Procurement**

Exhibit III-8 shows the current and forecast distribution of leased telecommunications service procurement by agency for major defense and civilian buyers.

Several assumptions about the forecast must be noted for interpretation. Both the Army and the Navy are expected to rank as top users of FTS 2000, as measured by interagency payments. For this forecast, however, all FTS 2000 expenditures are included in the civilian numbers, since GSA ultimately acquires the commercial services to support FTS 2000.

Total defense expenditures will continue to grow, even while shifting expenditures for FTS 2000 to GSA.

## EXHIBIT III-8

**Leading Leased Telecommunications Users**

Department/ Agency	\$ Thousands	
	Fiscal Year 1991	Fiscal Year 1992
<u>Defense</u>		
OSD; DISA and Other	1,395,243	1,384,694
Army	229,364	180,782
Navy	152,135	284,603
Air Force	138,455	144,222
U.S. Marine Corps	4,472	18,090
<u>Civilian</u>		
GSA	410,038	787,541 *
Treasury	215,284	199,767
Agriculture	106,987	73,538
NASA	85,290	97,634
Health and Human Services	84,536	105,218
Energy	68,886	65,787
Veterans Affairs	60,811	57,011
Justice	54,797	63,000
Transportation	30,026	43,180
State	27,920	33,000
EPA	27,427	33,751
Interior	23,854	21,205
Commerce	23,055	30,744

Source: FY 1992 Agency Submissions to OMB *Circular A-11, 43A*.

\*Includes FTS 2000



## D

---

### Vendor Market Share and Competition

The current list of potential suppliers of telecommunications systems and services to the federal government has grown to nearly 3,000 companies. However, INPUT believes that the actual number of direct suppliers will diminish under the pressure of intense competition for the federal dollar.

Reductions will result from two key factors:

- GSA and agencies are placing increasing emphasis on the provision of solutions, rather than specific products. With this emphasis, there will be a reduction in the number of vendors that provide only specific hardware.
- A high percentage of service requirements will be met through FTS 2000. As a result, products and services that relate to FTS 2000 will frequently be provided as a subcontract to either AT&T or US Sprint. Previously, the same product or services might have been provided directly. Products and services will more frequently be provided as part of systems integration contracts.

Smaller companies, including most start-ups, will be unable to maintain a strong federal market presence because of the size and capital-intensive nature of federal telecommunications programs. Federal agencies will continue to show preference for larger, established federal vendors acting as prime contractors or systems engineering and technical assistance (SETA) contractors.

Although it has been somewhat reduced by requirements of the FTS 2000 contract, AT&T's dominance of the federal telecommunications market will continue. Although holding a dominant position, AT&T remains vulnerable in several specific market segments. Companies such as Contel, Rolm, and Northern Telecom will continue to make inroads in the hardware market segment. Others could find success in niche segments, where a specific product or service is needed. In addition, AT&T revenues will increasingly include revenues that will be passed through to subcontractors.

INPUT expects systems integrators, experienced in the federal marketplace, to gain most in the federal telecommunications market. Agencywide network integration projects and other network procurements are likely to be suited to the expertise of systems integrators. For a detailed list of vendors by market segment, refer to Chapter VI Section B of this report.

INPUT believes that traditional value-added network (VAN) vendors will be hard pressed to expand their share of the market in the next few years. The distinction between VAN and common-carrier services is becoming blurred as traditional long-haul communications carriers add features previously available only from VANs. In addition, federal networks such as FTS 2000 and department- or agency-specific networks will offer services that compete directly with VANs.

## E

### Technological Impacts

---

As shown in Exhibit III-9, agencies and vendors generally agree about the types of new technologies that will affect federal telecommunications planning and acquisition in the 1992-1997 timeframe.

Emerging telecommunications technologies will play a major role in the federal market in the 1990s. Agencies and vendors generally agree on the timetable for these technologies, but the reasons differ.

Agencies want to avoid risk and stay a comfortable distance behind the leading edge of technology. Vendors believe that telecommunications technology is moving in advance of user requirements in the federal and private sectors, with the lag in the federal sector due to longer system life and procurement cycles.

Some federal agencies may be forced to adopt new telecommunications technology earlier in the 1990s. Agencies investing in supercomputer technology to meet high-volume data and computational requirements will encounter communications bottlenecks. Agencies with dispersed facilities in remote areas cannot meet emerging communications requirements through land-line carriers alone and are seeking alternative technologies.

INPUT's analysis indicates clearly that internetwork reliable connectivity and services are of higher priority than the latest technology.

## EXHIBIT III-9

### Technology Impact on Federal Telecommunications

Technology	Importance to*	
	Agency	Vendor
Local-Area Networks	High	High
Network Management Systems	High	High
Electronic Mail	High	High
Electronic Commerce	High	Average
Value-Added Networks	Average	Low
Satellite Networks	Low	Low
VSAT Networks	Low	Low
ISDN	Low	Average
Cellular Telephones	Low	Low

\*Vendor importance based on ranking, agency importance based on ratings.

## F

## Policy and Regulatory Prospects

Federal Information Resource Management Regulations (FIRMRs) have been in effect for several years as the primary source of guidance for agency acquisition, management, and use of ADP and telecommunications systems. However, frequent changes in the FIRMRs have continued to complicate things. The merging of agency ADP and telecommunications functions has slowed and continues to be problematic.

Voice and data communications organizations in most agencies have been merged into the Office of Information Resource Management (OIRM) only recently. But confusion about roles and responsibilities continues. Voice and data communications organizations typically address communications problems differently, making it difficult to achieve perceived economies through personnel reductions. Along with the organizational changes, budget planning and reporting are changing slowly to incorporate both voice and data communications program funding in agency information technology budgets.



Most federal agencies appear to be ready to implement systems under GOSIP—the Government Open Systems Interconnect Profile. GOSIP is a subset of the International Open Systems Interconnect Communication standard. GOSIP will support interoperability and data exchange among different federal computer systems and communications networks. As of 1990, GOSIP is a requirement for new telecommunications systems and services. Agencies will use GOSIP to integrate their multivendor networks and systems.

In the DoD, vendors face a potential dilemma. On the one hand, DoD has specified GOSIP as a mandatory standard. However, several DoD agencies are showing reluctance to abandon the Transmission Control Protocol/Internet Protocol (TCP/IP) standard.

Therefore, over the next few years, the DoD will procure systems with both GOSIP and TCP/IP. Further, it is certainly possible that, even after 1990, TCP/IP will still be used. Communications vendors, therefore, must show a willingness to adapt to changing government requirements. Requirement for the dual standard is evidenced by a recent Air Force contract to provide network interfaces that support both GOSIP and TCP/IP standards. The Air Force, unable to determine which standard to follow, decided that only a dual-standard approach would provide suitable connectivity.

In March 1992, US Sprint announced a nationwide TCP/IP network service. The network will connect various LANs using the TCP/IP standard.

Congress has already passed several measures to increase agency awareness and formulate computer security policy. The Electronic Communications Privacy Act (Public Law 100-235) requires agencies and vendors to provide end-to-end security and effective encryption for federal telecommunications systems. Among other things, the law specifically addresses the special requirements for protection of computer systems. GSA issued guidelines for implementing the Act.

The National Institute for Standards and Technology (NIST) will monitor and control the computer security program. The National Security Administration (NSA) will use its expertise to develop communication encryption techniques. There are several different levels of computer security to be executed under the legislation. The first actions to be taken are administrative and physical security measures, such as locked storage in computer facilities. Later phases involve the advancement of new computer systems with built-in security systems.

As is any other consumer, the federal government is subject to regulatory actions taken as a result of FCC Computer Inquiry III.



- Federal agencies must recognize regulatory restrictions and competitive needs in contracting requirements when formulating acquisition plans.
- Given the long-term uncertainties of the regulatory climate, agencies must be prepared to modify acquisition plans with little or no advance notice in response to regulatory or tariff changes.

## G

### Conclusions

---

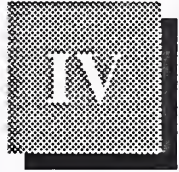
The long system life cycles for federal telecommunications systems will continue to provide a steady revenue stream for incumbent vendors. Further, incumbents will continue to capitalize on extension and expansion opportunities for existing contracts. These include minor hardware and software additions for existing contracts.

As with other federal market segments, INPUT expects fewer but larger contracts. In addition to FTS 2000, system engineering and technical assistance (SETA) will become more common for new or replacement systems. The continuing shortage of in-house technicians will also increase opportunities for telecommunications hardware maintenance and consulting, particularly for high-technology systems.

The federal telecommunications market does present some substantial risks. Most funding will continue to be concentrated in a relatively few, large network procurements. In recent contract awards, agencies have shown a preference for acquiring telecommunications service, directly or indirectly, through systems houses instead of larger established carriers. Also, budget constraints will foster competition for the more certain funding allocated to telecommunications programs.

Overall, though the federal telecommunications market has consolidated, there are attractive opportunities. Vendors that emphasize support and service will be more readily accepted. Vendors with products and services that support interconnection and interoperability will find a growing market. In addition, vendors that establish strong alliances with major network and systems integrators can find significant growth opportunities.





## Agency Requirements

As part of its research effort, INPUT interviewed federal officials responsible for agency telecommunications policy, planning, acquisition, management, and use. The views of users and key policy making agencies, listed in Exhibit IV-1, and the requirements of major user agencies are presented in the following sections.

### A

#### Key Players in Regulations, Standards, and Policy

Although the agencies described below are not major telecommunications users, their activities help to mold individual user agency telecommunications policy and plans.

EXHIBIT IV-1

#### Key Federal Agencies in Regulations, Standards, and Policy

- Federal Communications Commission (FCC)
- National Telecommunications and Information Administration (NTIA)
- National Communications System (NCS)
- National Institute for Standards and Technology (NIST)
- National Security Agency (NSA)
- Office of Management and Budget (OMB)

## **1. Federal Communications Commission**

The Federal Communications Commission (FCC) was established by the Federal Communications Act of 1934. Its mission includes regulation of interstate and international communications, scientific and technical support, and long-range policy and analysis. The FCC shares communications oversight with two other agencies.

- The FCC and the National Telecommunications and Information Administration (NTIA) jointly manage radio frequency assignment. NTIA has responsibility for federal radio frequencies, and the FCC handles the private sector.
- In times of national emergency, many of the responsibilities of the FCC transfer to the National Communications System (NCS).

The FCC affects the future of the federal telecommunications market through the continuing examination of deregulation (Computer Inquiry III) and of the effects and conditions of the AT&T divestiture.

The Inquiry III proceedings led to the establishment of nine points for Comparatively Efficient Interconnects (CEI). These points aim to promote standardization interfaces and common end-user access enhancement.

The FCC participated in the past in CCITT study groups to define ISDN standards. The FCC focuses on the standards that govern interfaces. The FCC also interacts with domestic and international telecommunications organizations on spectrum management and interference.

## **2. National Telecommunications and Information Administration**

The National Telecommunications and Information Administration (NTIA) was established as part of the Commerce Department in 1987 through a reorganization of the Office of Telecommunications Policy in the Executive Office of the President and Commerce's existing Office of Telecommunications. NTIA serves as one of the President's principal advisors on telecommunications and information issues and provides assistance to other federal agencies in the areas of telecommunications planning, design maintenance, and improvement.

NTIA sets federal telecommunications policy in three areas:

- Policies for which the government conducts its activities internal to the federal agencies
- Policies for industry and coordination of overlap between industry and federal agencies



- Policies for ISDN standards definition; working with the FCC and CCITT Study Groups

NTIA receives most of its sponsorship from the DoD and in particular the Army, DISA and NCS. The NTIA also assists with maintaining a central point of contact for the DDN, thus assuring emergency preparedness.

There is also ongoing cooperative work with NCS to develop federal modem and data encryption standards, including FED-STDs equivalent to the CCITT V.22bis, V.26, V.26bis, and V.32 standards and FED-STDs 1028 and 1029 for the application of DES to facsimile and digitized voice transmission. NTIA is not a decision-making body, but serves as a principal voice for the executive branch in domestic telecommunications policy that affects technical and economic advancement.

### **3. National Communications System**

The National Communications System (NCS) and the Federal Telecommunications Standards Program were established in 1972. In addition to its national emergency role in telecommunications, NCS develops the Federal Telecommunications Standards (FED-STDs), which are issued subsequently by GSA.

The ongoing NCS standards activities focus on two areas of concern to federal agencies:

- Interoperability of computer and communications systems
- Development of ISDN standards with CCITT

### **4. National Institute for Standards and Technology**

The National Institute for Standards and Technology (NIST), formerly the National Bureau of Standards, is part of the Department of Commerce. A primary function of NIST is to develop and issue the Federal Information Processing Standards (FIPS) under the provisions of Public Law 89-306 (the Brooks Act). Much of the actual development of the FIPS is done by the National Computer Systems Laboratory at NIST.

In response to the merging of communications and computer technology, standards development at NIST has increasingly involved joint efforts with NCS, such as the federal X.25 standard (FIPS 100, FED-STD 1041). NIST also works with DoD to develop MIL SPEC equivalents to the FIPS.

NIST has been concentrating on the development of federal standards compatible with CCITT OSI recommendations. Despite a clear preference on the part of NIST officials for OSI standards, NIST cannot mandate federal agencies' compliance. Federal policy in such matters must be set by OMB and enforced by GSA.

NIST sponsors a number of vendor programs to promote commercial development and implementation of OSI-compatible systems. It holds OSI workshops, which are very successful. They are held four to five times a year, with over 150 individuals in attendance at each. MAP/TOP demonstrations that use communications protocols based on OSI standards (FIPS 107, IEEE 802.2 and 802.3) are organized by various Special Interest Groups (SIGs). OSINET, a packet-switched network for development and testing of OSI products, is complete and on-line.

Since 1986, NIST has been working with DISA to define OSI standards for the DoD. The timeframe for implementation of these standards is not fixed. NIST estimates that it will take at least five years to move from current DoD standards such as TCP/IP to OSI. NIST is also completing the software for an electronic mail protocol in conjunction with the DCS for the ARPANET network.

At the request of the Department of Defense, NIST established an accreditation program for private laboratories prepared to test the computer industry's implementation of numerous Defense Department telecommunications protocols. The program will accredit labs capable of performing tests in accordance with methods designated by the institute. NIST will be certifying laboratories that can provide testing for three DoD protocols in particular: The Defense Data Network (DDN) X.25 link, the five DoD packet-switching high-level protocols, and the Autodin Mode protocol.

## **5. National Security Agency**

Under National Security Directive 145, the National Security Agency (NSA) was delegated responsibility for governmentwide communications security. However, as previously stated, NIST has primary responsibility for implementing the Computer Security Act. Specific information about NSA activities is available only to cleared individuals and corporations.

NSA continues to seek vendor cooperation in the applications of government cryptographic methods to commercial systems through the Commercial Comsec Endorsement Program (CCEP). NSA programs to certify trusted computer systems will influence the development of DoD communications systems such as DSN. DoD plans include the use of trusted software in programmable communications equipment such as digital switches. However, the time and expense associated with NSA certifications is discouraging many vendors.

## 6. Office of Management and Budget

The Office of Management and Budget (OMB) has taken a very active interest in the regulatory aspects of the telecommunications market and in federal agency plans for telecommunications systems.

At one time OMB was perceived to be opposed to the structure of GSA's FTS 2000 initiative. OMB has not clearly dismissed its concerns about some of the assumptions and projected benefits of the initiative. However, congressional pressure to implement FTS 2000 has largely eliminated OMB's reservations.

Under circular A-130, OMB will "...serve as the President's principal advisor on procurement and management of federal telecommunications systems."

OMB has increased its monitoring of sole-source telecommunications procurements, some of which may be represented by the agencies as a continuation of existing (predivestiture) contracts. OMB foresees potential legal problems for the government if such procurements are permitted in a newly competitive market subject to CICA and public scrutiny.

---

## B

### Agency Plans

Based on the research for this report, INPUT developed a listing of leading users of leased telecommunications services as reflected in the agency FY 1991 and FY 1992 A-11 submissions to the Office of Management and Budget. Major users and their requested funding were shown in Exhibit III-7. (A detailed listing of major projects and their requested funding are shown in Appendix B).

The following subsections highlight a number of agency projects for new or expanded telecommunications systems and services, and summarize agency requirements. The projects described in these sections are representative of the complexity of federal telecommunications initiatives. They also indicate the increasing complexity of networking within federal departments and agencies. Individual telecommunications programs are listed by agency in Chapter VI of the report.

#### 1. Defense

While funding for weapons systems and platforms, manning levels, and even the number of bases has been drastically reduced, funding for communications systems is increasing.



- U.S. Army Defense Satellite Communications Systems funding has been raised from \$48 million to \$112 million for FY 1993.
- U.S. Navy shipboard tactical communications funding increased from \$59 million to \$83 million, and satellite ship terminals from \$145 million to \$194 million.
- The Navy and Marine Corps received first-time funding for a global positioning system.

There are many reasons for these increases but there are primarily three driving factors.

- Lessons learned in the Desert Shield/Storm operations
- Operational telecommunications as a force multiplier, enabling a smaller military to operate more effectively
- Use of telecommunications as a productivity/cost reduction tool in most management and administrative processes

One of the most aggressive projects of the Defense Department is an upgrade to the World Wide Military Command and Control System (WWMCCS). Initiated in the early 1980s, the project has been plagued by problems of definition, standards, and procurement methodology.

WWMCCS is a DoD-wide network composed of warning sensors, 60 digital computer systems and telecommunications equipment used by the National Command Authority, the Joint Chiefs, and the Commanders in Chief of the unified and specified commands. The system is used to control U.S. military forces throughout the world.

The WAM (WWMCCS ADP Modernization) is a joint effort to modernize WWMCCS. Each branch of the military has its own WAM program to contribute to the project. All branches report to the Joint WAM office at the Defense Information Systems Agency. This program was previously named WIS.

The original WIS program was to be implemented in three phases. The first phase (begun in 1983) was to provide LAN equipment and extensive systems integration. Following initial implementation efforts, the systems did not conform to new DISA standards and work was halted.

Now that WIS has been replaced by WAM, the Joint WAM Program Office has decided to scrap specific components in favor of less structured procurement methods. Future acquisitions include a Joint Operations Planning and Execution System (JOPES), along with various LAN and AMH (Automated Message Handler) enhancements.



The project is highly complex and is representative of the focus of federal departments and agencies on integrating previously disparate systems. Although the project will continue, no specific schedule has been established.

As in the civilian side of the government, local-area networks are growing in importance in the military. The Navy Department's pending LAN acquisition contract will be an umbrella under which Navy organizations can acquire LANs to meet their local needs. Civilian agencies will also be able to acquire LANs under the contract. As evidence of the need for local-area networking, the vendor will be called upon to supply up to 300 LANs per month for the duration of the contract.

The DoD continues to voice concern over the issue of computer security. The Computer Security Act of 1987 has heightened this concern. Programs are not being delayed to accommodate security measures, but future telecommunications opportunities related to computer security are foreseeable, including:

- Encryption of long-distance data is needed to make the computer systems secure
- Program development and implementation of new software for secure systems that will not impact performance levels
- Assistance in developing Computer Security Plans for submission to NIST.

Security concerns and an ability to meet high criticality requirements contributed to the Defense Department's initial resistance to use of FTS 2000 to meet the DoD's needs. Security concerns associated with FTS 2000 continue.

Although work progresses in implementing digital networks to meet increasingly mission-critical requirements, high-level discussions have led to agreements to use FTS 2000 to meet at least part of the department's requirements.

The Defense Department and GSA have agreed to a phased approach to using FTS 2000.

- Initial focus will be on the department's use of FTS 2000 for nonsecure, direct dialing, WATS, and 800 services.
- Following the initial application of FTS 2000 the Defense Department will use FTS 2000 to meet nonsecure data transmission needs.

- The Defense Department will not use FTS 2000 for communications requiring security.
- Some time will be required for the Defense Department to identify secure and nonsecure data network needs, since they are currently integrated into the same networks.
- By agreement with GSA, the Defense Department's Defense Commercial Communications Organization (DECCO) will be the primary point of interface for the acquisition of FTS 2000 services.

Pending projects and funding requests clearly indicate the Defense Department's commitment to using telecommunications technology.

The Defense Data Network (DDN) was created in 1982 by the DoD to consolidate a wide variety of costly, fragmented, specialized networks. The network is managed by DISA (formerly DCA). DDN connected 2,156 systems in 1986 and 3,946 in 1991. Critics of DDN point out that waivers have been granted to 91 separate DoD networks and DISA has relied heavily on sole-source and directed procurements.

Even though some functions of the DDN are being shifted to FTS 2000, DISA has proposed a \$125 million expansion plan. Part of the upgrade will allow for the overlapping of 3 separate host-to-host classified, encrypted systems. GAO has predicted DDN growth of over 100% in the next five years.

## 2. GSA

For the past three years, GSA's attention has been directed toward FTS 2000. Although there are other projects, the importance of FTS 2000 as a basic infrastructure is sufficient to require nearly all of GSA's attention.

During the five-year forecast period, GSA is expected to continue to expand the use of FTS 2000. In addition, INPUT believes that increased emphasis will be placed on enhancing internetworking capabilities and implementing services such as E-mail and EC.

GSA installed a large EC system for procurement transactions with the major government suppliers. GSA has an ongoing program to automate the procurement process and provide on-line access to information.

In February 1992, GSA announced a prototype installation of Bell Atlantic's Switched Multimegabit Data Service (Pre-SMDS). The SMDS service provides connectionless data transfer at 1.17 megabits/sec. The GSA pilot project in Philadelphia routes LAN traffic between buildings several blocks apart.

### 3. Department of Energy

The Department of Energy (DOE), in addition to being one of the large civil users of commercial telecommunications service, relies heavily on contractor support to meet telecommunications requirements. The support includes planning, implementation, operations, and maintenance of telecommunications facilities and services.

To support a need for high-speed, high-capacity networking requirements, the Department of Energy, through the Lawrence Livermore National Laboratory (LLNL), became one of the country's largest users of ISDN services. To meet current and growing needs, the Lab has converted more than 10,000 users in 600 buildings from their previous Centrex service to ISDN lines. While this places additional responsibility on the Laboratory's staff, the Lab expects to save money during the first year.

DOE's Sandia National Laboratories has been recognized for major achievements in creating an interoperable network connecting 42 different vendors' systems. The systems range from dumb terminals and PCs to workstations and minicomputers, up to parallel processors and supercomputers. The same network maintains separation between classified and unclassified information and also internal and external business. The Sandia site is connected to LLNL via five T-1 1.5 megabits/sec lines. Plans include upgrading this link to 622 megabits/sec.

### 4. Department of Agriculture

Until recently, the Department of Agriculture's (USDA) data communications requirements were met largely by a department network (DEPNET). The department had plans to expand DEPNET, but has decided to use FTS 2000 rather than recompeting DEPNET services.

However, USDA has a need to provide telecommunications service to more than 16,000 field offices throughout the country. Many of these offices are not serviced by FTS 2000. USDA initiated a procurement for services that are outside FTS 2000. USDA has contracted with US Sprint to provide networking services.

The Department of Agriculture's Agriculture Stabilization and Conservation Service is planning a replacement system to connect all of its locations. In addition to the current 2,800 locations, ASCS plans to give access to all users, farmers and agribusinesses.

The USDA's projects and plans are another indication of the importance of integrating office and national networking capabilities.



## 5. State Department

To meet growing needs for integrated, international network services, the State Department requested proposals for the provision of a new international network service to serve 275 international locations and 50 non-State agencies with packet-switched data, voice services, and secure video conferencing. After the total funding request grew to \$584 million, Congress vetoed the project. A modest \$15 million upgrade to enhance the Diplomatic Telecommunications Service (DTS) was approved. DOSTN will probably resurface in some modified form.

## 6. Preferred Acquisition Methods

With only a few exceptions, agencies have centralized planning and acquisition of telecommunications services within the OIRM. Although separate voice and data communications offices exist in some agencies, integration of these offices is imminent.

Agencies prefer to meet their telecommunications requirements in a variety of ways, as shown in Exhibit IV-2, many using more than one source of supply. Acquisition of integrated systems is the preferred method of acquiring services; however, for the majority of agencies this approach will only be used for acquiring agency-specific networks and services.

EXHIBIT IV-2

### Preferred Method for Acquiring New or Improved Telecommunications

Method	Preference Ranking	
	1990	1988
Buy Integrated Systems	1	2
Buy Common Carrier Services	2	1
Use GSA or DCA Services	3	5
Buy VAN Services	4	4
Hire Contractor to Integrate Agency Components	5	3
Buy Components and Integrate In-House	6	6



As reflected in other sections and discussed in Chapter VI, FTS 2000 is the method that agencies will use to meet the majority of their networking needs. In fact, acceptance of FTS 2000 as a viable method of meeting agency needs has been growing steadily.

Although over half of the agencies contacted use VAN services, and increases in the use of VAN services are expected, the majority of agencies expect to obtain these services as part of FTS 2000.

Departments and agencies face the need for increasingly complex networks. With FTS 2000 a requirement for meeting most basic federal requirements, there is a growing need for professional and integration services to identify methods for connecting fragmented networks and systems.

## C

### Technology Trends

---

#### 1. Voice and Data Services

Voice service continues to dominate federal government telecommunications spending. This is not expected to change in the near future. However, as in the private sector, primary growth is expected in network based services, with spending for voice services remaining constant or growing at only a modest rate.

Federal agency personnel are evenly divided in their belief about whether voice services will increase or decrease over the next five years, as is shown in Exhibit IV-3. Those believing that expenditures will increase attributed the growth to two reasons.

First, demand will continue to increase and second, they do not believe that FTS 2000 will result in significant cost savings. In some cases they believe that increased use will be greater than the cost savings causing an increase in spending. However, all believe that any increases will be modest.

Agencies that believe that spending for voice telecommunications services will decrease attributed the decrease primarily to the use of FTS 2000, believing that savings will offset any growth in use.

Agencies almost universally expect expenditures for leased circuits, VANs, hardware, and software to increase. A small percent expected them to remain the same. Overall, virtually none expect a decline. The responses are understandable. Networks (including hardware and software) to connect systems and operating sites will experience significant growth.

## EXHIBIT IV-3

### Federal Telecommunications Spending Directions

Product Category	Percent of Respondents Indicating Spending*		
	Increase	Decrease	Same
Voice	42	42	17
Leased Circuits	73	18	9
VANs	80	0	20
Hardware	78	0	22
Software	78	11	11

\*Rows may not add to 100% due to rounding.

Agencies do anticipate significant changes in the mix of voice/data and analog/digital communications during the next five years, as shown in Exhibit IV-4.

## EXHIBIT IV-4

### Percentage Distribution of Telecommunications Traffic

	Current	Future (1997)
Voice	60	40
Data	40	60
-----	-----	-----
Analog	70	50
Digital	30	50

From 1992 through 1997, data traffic will increase at a much greater rate than will voice traffic, with the relative proportions of voice and data traffic favoring data in the late 1990s. Some agencies also noted a requirement for higher data speed and increased accuracy in future communications networks. The growing popularity of facsimile equipment will also lead to more traffic.

Note that, in INPUT's previous report, the shift from voice to data and from analog to digital was projected to occur in the early 1990s. The transition has not occurred as quickly as anticipated due to the extended time necessary to accomplish selection of the vendors for FTS 2000 services. During the selection process, many changes were put on hold as agencies analyzed the services that would be available. However, the selection process has only delayed, not curtailed, the shift. With FTS 2000 now being implemented, the shift in emphasis should begin to occur at a steady rate.

Growth in leased circuit and value-added network services is expected by nearly all agencies. However, most agencies are quick to note that the increases will be derived primarily from use of FTS 2000. With the exception of those that have agency-specific requirements, such as security, nearly all expect to use the leased circuit and value added network capabilities of FTS 2000.

The number of value-added network users is expected to grow significantly over the next five years. Approximately 50% of the agencies expect to expand their use of value-added network services. However, as with leased circuit services, they expect that the services will be derived from FTS 2000, not from other networks. One of the primary uses will be for electronic mail, which agencies indicate is of high importance.

Both hardware and software are expected to continue to grow. The growth in hardware will be primarily for data network connections. The growth in software is expected primarily to support protocol conversion between older and newer data network services and to provide for local-area network services. Note that this hardware is exclusive of expenditures for the replacement or addition of voice systems.

## **2. Network Management**

Effective network management is important to all federal agencies. Agencies indicate that nearly 60% of their agency-specific data networks are managed by in-house staff, and of those managing their own networks, over 70% use a centralized network management approach.



A more recent study—INPUT's report *Federal Network Management Market, 1991-1996*—found an increase in the use of network management. INPUT now expects the federal network management market to grow from \$91 million in FY 1991 to \$180 million in FY 1996, at a compound annual growth rate of 15%.

The professional services component of network management, while remaining the largest category, will lag behind the other categories (hardware and software) in growth rates. Most agencies intend to self-manage their networks, without using a contractor.

To date, federal departments have followed a path similar to that of the private sector in managing their network. Netview and Novell are the most common wide-area and local-area network management products. Currently, one-quarter of federal departments contract for wide-area network management, while only one-tenth contract for local-area network management.

As indicated in Exhibit IV-5, lack of in-house staff technical expertise is the main reason for considering network management services. This is being driven by increased network complexity and interconnection. Conversely, the availability of high quality network management tools, especially for LANs, is helping to reduce the necessity and cost of network management. There are other reasons that some agencies are not considering third-party network management.

EXHIBIT IV-5

### Agency Consideration of Third-Party Network Management

Considered Third-Party Management?	Percent of Respondents	Reasons*
Yes	45	<ul style="list-style-type: none"> <li>• Lack of Technical Expertise</li> </ul>
No	55	<ul style="list-style-type: none"> <li>• Violates Security Requirements</li> <li>• Not Necessary</li> <li>• High Cost</li> <li>• Must Use FTS 2000</li> </ul>

\*Not ranked by order of importance.



- Growing use of FTS 2000 reduces the need for major considerations of contracted network management. Agencies have an expectation that FTS 2000 will provide the degree of management necessary to meet their needs.
- Security requirements continue to dominate the concerns of many agencies. This domination is not expected to change in the near future and could increase. Agencies believe that security requirements necessitate that they retain management control over their networks.
- Some telecommunications and network management will be purchased through system integration and systems operations contracts.

### **3. Local-Area Networks**

The number of individual procurements for LANs continues to decline. This does not represent a decrease in the installation of new LANs but rather a change in how these procurements are identified and executed. As LAN procurements become more common, they become more difficult to identify. Some of the changes are as follows:

- Integrated procurements where the LAN is only a small part of the entire program. For example, several major office automation projects will use LANs but the LAN is not separately identified.
- An agency can purchase low volumes of LAN hardware and software from GSA schedules and professional services for installation and support from Basic Ordering Agreements.
- Many current procurements are replications of established and proven systems being expanded to multiple sites. These systems will be installed using the current vendors.

In September 1988, the Air Force awarded a four-year dual-service contract to EDS and TRW for LAN equipment, software and services. In April 1990, this contract (ULANA) was expanded to all DoD agencies. The combined value of the current contract is an estimated \$158 million. This is almost equal to the total value of all LAN programs identified in INPUT's 1990 report. This contract will be replaced by a follow-on contract (ULANA-II). There is some speculation that this contract will include all civilian agencies.

With more than 90% of agencies currently using local-area networks to some extent, emphasis is shifting toward projects to integrate networks that have already been installed. Over the next five years, agencies expect that more than 85% of their local-area networks will be integrated.

Integration methods vary considerably, depending on the agency. Agencies whose activities are highly centralized plan to implement building and campuswide network structures. Those that are geographically dispersed expect to be able to link local (office) networks to FTS 2000 to achieve a national integrated network capability.

#### 4. Network Integration

Federal agencies do not attach as much importance to integrated network services as do their counterparts in the private sector.

As shown in Exhibit IV-6, agency representatives consider integrated network services to be of only average importance and only half have plans for comprehensive network integration projects. (Network integration refers, in this context, to the integration of voice, data, and text services into a common network.)

EXHIBIT IV-6

Agency Use of Integrated Network Services	
Average Importance Rating*	Percent Planning Network Integration through FY 1995
3.31	54.0

\*1 - 5 scale, where 5 = very important and  
1 = not important at all.

In contrast, private sector organizations rate integrated networks as very important. INPUT believes that there are two primary reasons for the differences.

- The first is that many federal agencies do not have the same needs for a wide range of complex networks.
- The second is that federal agencies look to FTS 2000 as the primary means of accomplishing network integration. From available data, agencies believe that FTS 2000 will be able to meet the majority of their known needs.

## 5. Satellites and VSATs

Neither VSAT nor the capabilities of large satellite systems hold a great deal of interest for federal agencies. The Department of Agriculture expresses interest in VSAT-type systems as a low-cost method of data distribution, but the interest is mild.

Although 47% of the agencies indicate that they are currently using some type of satellite service and 40% have considered VSAT services, most satellite services are used as backup to terrestrial networks. As indicated in Exhibit IV-7, the importance of satellite services to meet agency network needs by 1995 is considered to be of less than average importance.

EXHIBIT IV-7

Importance of VSATs and Satellite Systems		
System Type	Average Importance by 1995	Rating Explanation
Satellite	2.4	• Little or No Requirement
VSAT	2.5	<ul style="list-style-type: none"> <li>• Little or No Requirement</li> <li>• Low-Cost Solution</li> <li>• Effective Data Distribution</li> </ul>

## 6. Cellular Communications

Cellular communications are viewed as having very limited application in meeting agency telecommunication needs. They are generally considered costly and have only limited functionality when considering overall agency needs. Rating the importance of cellular communications by 1995, agencies indicated that this technology will be of very little importance.

## 7. E-Mail and EC

Agencies consider network services such as electronic mail (E-mail) and electronic commerce (EC) to be of high importance. Electronic commerce includes electronic document (or data) interchange (EDI).



Agencies recognize the value of electronic mail and plan to use this FTS 2000 service at the earliest possible time. Overall, agencies that need to interact with offices around the country consider E-mail to be of very high importance. Those with activities concentrated in a single geographic area consider the service important, but not to the same extent as agencies that are nationally dispersed.

Electronic data interchange is also of high importance to many federal agencies. EDI received the highest rating from those agencies that interact financially with the private sector. Average ratings for E-mail and EDI services are shown in Exhibit IV-8.

## EXHIBIT IV-8

### Agency Importance Ratings of Network Applications

Application	Average Rating*
Electronic Mail	4.3
EDI	3.1

\*1 - 5 scale, where 5 = very important,  
1 = not important at all.

Note: for period 1990-1995.

Note should be made that agencies that have a high degree of financial interaction with the public consider EDI to be of greater importance. While they are waiting for standards to become more settled, agencies are expected to have high interest in EDI services.

## 8. ISDN

Characterized by some as a technology waiting to emerge or a technological Catch-22, ISDN is being watched carefully by nearly all federal agencies and departments.

Providing an ability to integrate voice, data, text, and image into a single transmission medium, federal agencies recognize that ISDN provides significant opportunity to improve their operations and, potentially, reduce costs. They also recognize that a lack of standards results in a Catch-22, where the wide variety of equipment will frequently not work with ISDN-based equipment.



However, recognizing benefits, some are forging ahead with major projects.

- The Air Force began testing of a facility-wide ISDN network in 1987. Since there were no model contracts to work from, the Air Force prepared a contract for a Base Integrated Digital Distribution System (BIDDS). The pilot project has been running at Mather Air Force Base (California) and, based on the test results, the Air Force expects to move the project to Barksdale Air Force Base (Louisiana).
- The Department of Defense awarded Bell Atlantic a 10 year, \$600 million contract to modernize the Washington, DC area telephone network (TEMPO). Under that contract, AT&T will supply ISDN technology through 25 central office switches.
- In one of the largest single conversion efforts, Lawrence Livermore National Laboratories (LLNL) has converted more than 10,000 users in 600 buildings from their previous Centrex service to 8,000 ISDN circuits. Even with the additional responsibilities for network management, LLNL expects to save money.
- The Department of Energy has taken a different approach, contracting with U.S. West to provide ISDN-based Centrex services to one of its facilities in Rocky Flats, Colorado.

With interest high and several agencies moving ahead aggressively, the GSA is preparing a package of related contracts to make ISDN available as agencies identify specific needs. However, with the exception of a number of specific cases, growth is expected to be slow.

For the rate of growth to increase, vendors will need to be able to identify specific sets of services and ensure compatibility of the equipment needed to deliver the services. To date, vendors have not been able to identify specific services for which there is an overriding need to commit to ISDN.

## 9. Other

Numerous additional technological innovations will find their way into government agencies. In some cases, the new capabilities help to solve some unique government needs. The availability of add-in PC digital modems and FAX boards allows a government manager to receive and send FAX messages, E-mail, word processing and spreadsheet files, reducing the exposure of a document in paper form.

Voice messaging (mailboxes), voice bulletin boards, electronic bulletin boards, electronic document transfer, concurrent engineering, electronic CAD/CAM transfer, paging (beepers), FAX-on-demand, broadcast FAX and FAX messaging (mailboxes) are all starting to be used in government agencies to improve productivity.

Other technologies also create the need for lower technology products and services. For example, the installation of a LAN requires substantial rewiring of a building to accommodate the co-axial or fiber optic cables, connections and outlets. Some new buildings are being designed and constructed with integral data paths.

## 10. Risk

In general, the new technologies incorporated in the newer telecommunications equipment are more reliable and less prone to failure. However, as the capacity and capability of each piece of equipment increases, a higher number of circuits are affected if one piece fails. Also, more application areas are dependent upon communications—therefore a failure affects more functional areas.

One common problem is that long-distance fiber optic cable is routinely routed through conduits previously used by larger copper cables. Although these fiber cables could be used for services provided by several companies, they all take the same physical path to the local telephone company's point of presence. In some recent examples, the severing of the conduit, a power failure, and a fire at the local point of presence disrupted long-distance service provided by all vendors in an individual city.

In another example, the misentry of one single character of code in one of millions of lines of instructions in the software for the local telephone switches caused service outages in several cities. This was a particularly difficult problem to diagnose and caused systems failures over several weeks.

System risk and reliability are recognized in most government procurements and the government often pays more for telecommunications networks that are less vulnerable. Increased reliability is gained through system redundancy, dynamic routing, network management centers, and call prioritization.

## D

---

### Agency Perspectives

INPUT asked agency officials their views on major nontechnical impacts on federal telecommunications. Agency officials also provided suggestions for improvements that vendors could make in telecommunications systems and services to increase their value to the government.

## 1. Nontechnical Impacts

Most agency officials felt that legislative and regulatory policies will continue to influence their plans and acquisitions for the foreseeable future. Agencies cannot predict the timing or effects of additional FCC and OMB actions and consequently encounter difficulty in forecasting telecommunications costs and acquisition schedules. Governmentwide or agencywide telecommunications programs need to reflect agency telecommunication needs and be supportive of these needs.

Every agency expressed concern over congressional budget actions to counteract the rising federal deficit. In general, agencies with security or emergency-preparedness missions felt less threatened by budget cuts. In periods of budget reduction, use of telecommunications facilities, such as teleconferencing, gains favor as a cost-effective alternative to travel. FIRMR Bulletin 16, *Travel by Federal Telecommunications System*, substantiates this view.

Reductions in the DoD budget would force some reallocation of telecommunications funds. In most cases, strategic and tactical systems receive priority. However, base communications modernization programs lose funding or are deferred to later years.

## 2. Telecommunications Use Effectiveness

Agencies consider their effectiveness in using telecommunications products and services to be average. This rating is not dissimilar to that of the private sector. However, the reasons for not making greater use of telecommunications to meet organizational needs are somewhat different from those in the private sector.

As shown in Exhibit IV-9, agencies believe that they have little need for telecommunications technology. They also believe that there is a lack of planning and that they need integrated products and services.

Private sector organizations frequently identify lack of planning and the need for integrated services as reasons for not using new technology. However, the private sector acknowledges a need for telecommunications technology.

Federal agencies believe that there is a lack of need for telecommunications technology. INPUT does not dispute the agencies' perspective, but believes that this perspective must be viewed in light of several factors.



## EXHIBIT IV-9

### Effectiveness of Telecommunications Use

Average Rating*	Rating Explanations
3.3	<ul style="list-style-type: none"> <li>• Little Need of Technologies</li> <li>• Lack of Planning</li> <li>• Need Better Integration of Services</li> </ul>

\*1 - 5 scale, where 5 = very effective, 1 = not effective at all.

- In INPUT's survey, agencies rated the need for products and services such as local-area networks and electronic mail very highly. This reflects a need for telecommunications-based technologies. They also consistently noted a need to integrate local-area networks and to provide network interoperability.
- The contract for FTS 2000 provides for a wide range of services and features. The ability to add the latest products and services to FTS 2000 suggests a need to make use of current telecommunications technology.
- The fact that use of FTS 2000 is mandated, except in specific cases, suggests that most agencies will meet the majority of their needs through FTS 2000. Most agencies believe that FTS 2000 will meet the majority of their needs.

With these considerations in mind, INPUT believes that agencies do have a need for telecommunications technologies. Agencies' responses therefore indicate that they do not have needs beyond the features and services that will be readily available to them.

INPUT also believes that federal agencies would make greater use of telecommunications technology if products and services were integrated and provided the necessary degree of interoperability.

### 3. Driving Forces

Federal agencies identify a number of positive factors that will affect the telecommunications market over the next five years, as shown in Exhibit IV-10.



## EXHIBIT IV-10

Driving Forces	
Factors	Rank*
Technology Advances	1
Price Reductions	2
Data Distribution Demands	2
Voice Mail Availability	4

\*Rank based on frequency of mention by respondents.

- Technological advancement is the most frequently mentioned force behind greater use of telecommunications. Advances that agencies believe will contribute to the greatest growth are LAN internetworking products and electronic mail services. Network management tools are also important. Managing local-area networks is of growing concern to the agencies.
- Price reductions and needs to distribute data are rated nearly equally. Agencies believe that costs will continue to come down, driving telecommunications use as an alternative to face-to-face meetings. The need to disseminate data will also contribute to increased telecommunications use.

#### 4. Inhibiting Factors

Although technology advances and declining prices will stimulate increased use of telecommunications, the political environment and security considerations will have the greatest inhibiting effect. As shown in Exhibit IV-11, these two factors lead the list of negative factors affecting the use of telecommunications.

When considering political relations, agencies are generally referring to the ability of the legislative and executive branches of government to reach agreement on budgets and funding levels.

The global political situation also has an impact on the rate of telecommunications spending. Global political change and tensions tend to result in increased communications, and increased spending for new facilities. Reduced political unrest eases the demand for increased communications.

EXHIBIT IV-11

### Inhibiting Factors

- Political Relations
- Security Issues
- Cost/Available Funding

Growing concerns about security will have an inhibiting effect on investment in new telecommunications services. Agencies and departments with high security requirements will not make major investments unless they can obtain significantly enhanced security capabilities.

### 5. Vendor Weaknesses

Lack of knowledgeable personnel and a low level of support lead the list of vendor weaknesses. Agencies believe that vendors have only one interest: sale of a specific product, as shown in Exhibit IV-12.

EXHIBIT IV-12

### Vendor Weaknesses

Weaknesses	Percent of Respondents
Lack of Knowledgeable Personnel	30
Low Support/Service Levels	30
Proprietary Systems	10
Volume-Sensitive Pricing	10
Inadequate Technology	10
Business Attitude	10

Federal agencies express interest in trends and directions in the telecommunications industry. Agencies have little interest in dealing with vendors who have knowledge of only one product or product line or who have little knowledge about how the federal procurement process works. A consistent theme of the interviews with agencies is that agencies are continually having to educate vendors in federal processes and practices.

Agencies express little satisfaction with the after-sales support provided by most vendors. Results of interviews indicate clearly that vendors that provide consistent, high-quality after-sales support will be viewed more favorably than other vendors.

## **6. Agency Recommendations to Vendors**

One of the most frequent observations made by agencies contacted is that vendors should improve their image with federal officials through better pre- and post-sales support. Agency officials frequently commented on vendor-buyer business relationships. Vendors are too opportunity-oriented and only concerned with making the next sale.

To most agency representatives, after-sales support is more critical than sales or implementation support. While sales and implementation support is important, support that provides ongoing education and ensures industry awareness represents a higher value to agency respondents.

Although FTS 2000 may address some issues, network interoperability is a high-priority requirement. The growing number of LANs and the need for electronic mail services necessitates an ability to communicate between disparate networks.

Closely aligned with support is the need for education and training. With a less technically knowledgeable staff, continuing training programs are necessary. In addition, the federal procurement process insulates many decision makers from the latest technology. Education is necessary to ensure that program managers and policymakers are aware of technology that is available.

In addition to these recommendations, summarized in Exhibit IV-13, agencies frequently mentioned other recommendations.

## EXHIBIT IV-13

### Agency Recommendations to Vendors

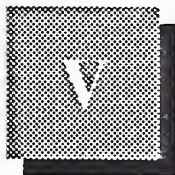
Services/Products	Rank*
More Service/Support	1
Interoperability of Products	2
Better Education/Training	2
Integrate Services	4
New Technology	4

\*Rank based on frequency of mention.

Most agencies want vendors to work toward and support common telecommunications standards, even though the OSI reference model has not yet become effective. Vendors should address the government's protracted problems with system interconnection and interoperability by supplying compatible hardware architecture and communications protocols. In most cases, however, this is incompatible with the vendors' marketing thrusts.

Agency officials noted a growing need for secure telecommunications, including end-to-end encryption. Vendors should develop additional and more-secure systems and services. Current PBX equipment and facilities were mentioned as being particularly difficult to secure.





# Implications of FTS 2000

## A

### Background

---

In its original form, the FTS 2000 program provided for the replacement of the FTS through a single contract with a prime services vendor. The vendor awarded the FTS 2000 contract would provide the federal government with a variety of telecommunications services. These services would include:

- Switched voice
- Switched data
- Packet switching
- Video transmission
- Switched digital integrated and dedicated transmission

GSA estimated the initial contract value of these services at between \$400 and \$450 million a year, possibly reaching to as much as \$25 billion over the ten-year period. GSA will neither lease circuits nor purchase hardware or facilities in support of FTS 2000.

Although the term of the initial FTS 2000 contract would extend over ten years, the contractors would be given no guarantee of system usage after the first three years, which conforms with the length of FTS 2000 subscription agreements to be executed between GSA and individual agencies. The FTS 2000 program was delayed by agency opposition, vendor complaints and protests, GAO audits, and congressional concerns.

In 1987, in response to congressional pressure, the General Services Administration withdrew the original RFP to revise it. In the revised RFP, two contracts would be awarded on an approximately 60/40 allocation of the \$450 million minimum guaranteed revenue. Separate Service Oversight Centers (SOCs) would handle each contract. The contract was awarded in late 1988, with AT&T winning 60% of the contract value. US Sprint was awarded the other 40%.

FTS 2000 represents a significant change in GSA's approach to providing telecommunications services. As part of the FTS 2000 contract, GSA is purchasing telecommunications service, rather than leasing the equipment. And GSA will oversee the contractors' management of the system, rather than manage the system itself.

A key requirement of FTS 2000 is that organizations are required to use it, unless a specific exemption is obtained. To ensure its use, Public Law 100-440 was passed in September 1988, mandating use of FTS 2000. To gain an exemption, two key criteria must be met.

- An agency's requirements must be sufficiently unique that they cannot be met by FTS 2000.
- The agency's procurement to satisfy the unique requirements must be cost-effective and not adversely affect the cost-effectiveness of FTS 2000.

As a result of the Public Law, GSA suspended 18 delegations of procurement authority issued prior to the award. Of the 18, GSA determined that the requirements of 14 could be met by FTS 2000. Only 4 organizations were permitted to proceed with their own procurements. As of April 1991, GSA had granted 102 exceptions out of a total of 172 FTS 2000 exception requests.

## B

### Status of Cutover

---

Considering the complexity of converting systems serving an estimated 1.3 million people, the process of converting from FTS to FTS 2000 has progressed smoothly. With a few exceptions, resistance has not been as great as initial indications suggested it might be. Agencies, particularly smaller ones, have generally accepted FTS 2000 as the option of choice for voice and basic data services. Conversion of voice systems for the majority of the federal agencies and departments was essentially completed by mid-year 1990. This was 18 months ahead of schedule.

Use of FTS 2000 for data networking needs is proving to be the greatest obstacle, with a number of agencies and departments indicating that they plan on continuing to use agency-specific networks. The obstacles center around two key issues.

- Security requirements lead the list of reasons that departments such as State and Defense believe that they should be permitted to continue to use organization-specific data networks. Both State and Defense indicate that they will continue to use networks such as DDN (Defense) to meet their needs.

- Following an outright refusal to use FTS 2000, negotiations between Defense and GSA resulted in an agreement for Defense to use FTS 2000 for identifiable, nonsecure, administrative purposes. Defense also agreed to work to identify nonsecure voice traffic that is currently incorporated in its networks and shift the traffic to FTS 2000.
- Defense also indicated that it would *consider* the identification of nonsecure data traffic and shift this to FTS 2000. However, Defense noted that isolating secure and nonsecure data traffic would take time.

In addition to pure network issues, unique service needs are also considered reasons for special exemptions. The National Institute of Allergy and Infectious Diseases (NIAID) was granted an exemption to use MCI-Mail rather than the E-mail facilities available as part of FTS 2000. The exemption was granted based on the Institute's need to send and receive messages to and from a wide variety of nonfederal organizations that are not connected to FTS 2000.

Recognizing that there are legitimate needs for continuing to procure services outside FTS 2000, GSA has granted a number of blanket exemptions, including the following:

- The Department of Defense is exempt from requesting authority to procure equipment and services from GSA from requirements pertaining to DoD's command and control function.
- The Nuclear Regulatory Commission has received an exemption for procurements related to the Emergency Telephone System and the Regional Office Incidence Response Center.
- The Federal Aviation Administration has received an exemption for procurements related to facilities and services for air traffic control.
- The Department of Energy is exempt for procurements related to five Regional Power Administrations.
- The Department of Veterans Affairs is exempt for procurements related to facilities installed in hospitals for biomedical communications.
- The National Aeronautics and Space Administration is exempt for procurements related to missile and satellite tracking facilities.
- The Tennessee Valley Authority is exempt for procurements related to operation of the Tennessee Valley Authority projects.
- The Department of Justice/Bureau of Prisons was exempted for procurements related to facilities installed in penal or correctional facilities. The Bureau of Prisons has subsequently agreed to use FTS 2000.



Although the conversion of voice is moving reasonably smoothly and concerns over data networking remain, some agencies have begun to use some of the more advanced capabilities of FTS 2000. The EPA is already involved in a \$150,000 test of the video conferencing capabilities of FTS 2000. EPA indicates that it has strong interest in using video conferencing among 15-20 offices nationwide. EPA believes that the costs will be more than offset by savings in travel.

## C

### Service Scope Issues

---

As with many large contracts, questions about the provision of functions and features that have been either not specifically addressed or addressed in only a broad sense result in questions by both users and vendors. FTS 2000 is no different.

Since awarding the contract for FTS 2000, questions and concerns have been raised about a number of services. The most notable ones are discussed below.

#### 1. International Service

The program requires that FTS 2000 "...provide interconnectivity between FTS 2000 and IDDD gateway carriers who provide IDDD services to federal agencies."

Though both AT&T and US Sprint are "international gateway carriers," the contract does not preclude other international record carriers (IRCs) or recognized private operating agencies (RPOAs) that have agreements with the federal government from providing international carrier services.

Not specifically stated in the RFP is whether interconnectivity is limited to voice services or would include data services. However, data service provision is implied by the specification that FTS 2000 provides service only to the continental United States, Alaska, Hawaii, Puerto Rico, and the U.S. Virgin Islands.

#### 2. Security and Encryption

Security and encryption have been raised as issues by several agencies and have been used to obtain exemptions from use of FTS 2000. Most notable are the Defense and State Departments, which have high requirements for classified voice and data transmission.



From a vendor's standpoint, security and encryption should not be major issues. The FTS 2000 RFP is clear in stating that "...FTS 2000 shall be used...to transport Sensitive But Unclassified (SBU) traffic." By omission, the FTS 2000 RFP is clear in stating that federal agencies are responsible for ensuring the security of their data.

- The FTS 2000 network however, is able to transmit voice and data traffic that has been encrypted by federal agencies and departments. When encryption is necessary, the agency or department requiring the encryption is responsible for providing the encryption and decryption of traffic (voice or data) entering and leaving the network.
- The FTS 2000 network is clearly intended to meet the general business needs of the majority of federal agencies and departments, not provide for extraordinary security requirements. For high-level security requirements, agencies or departments can either provide for their own security or, in the case of the Defense and State Departments, obtain exemptions from use of FTS 2000.

### 3. Toll-Free Service

The recent granting of permission to US Sprint to provide toll-free call-in service for IRS customers has raised a question of concern to many vendors. Although FTS 2000 was intended to provide a baseline network that would evolve over time as new technologies became available, granting permission to provide a service that is currently available and not specified as part of the FTS 2000 RFP raises the question of whether GSA will consider *any* service to automatically fall within the bounds of the FTS 2000 contract.

The denial of MCI's protest over the addition of toll-free (800) service allows GSA to continue to view the FTS 2000 network as a basic infrastructure to which new services can be added. Therefore AT&T and US Sprint will be in the best positions to provide new or enhanced services. This ruling will likely put other vendors at a competitive disadvantage.

### 4. On-Net/Off-Net Services

Although little notice has been taken, a question arises as to the extent to which either AT&T or US Sprint can provide services within a geographic area for which neither organization has operating authority.

As specified in the Modified Final Judgment resulting from the AT&T divestiture, interexchange carriers such as AT&T and US Sprint are permitted to provide service between, but not within, small geographic areas such as a single city.

A notable example is the WITS (Washington Interagency Telephone System) network within the Washington, D.C. metropolitan area. Since C&P Telephone, through Bell Atlantic, has operating authority within the Washington area, neither AT&T nor US Sprint are permitted to provide service within the area.

FTS 2000 provides for the interface of inter-area (on-net) and local-area (off-net) transmission, but with prices becoming increasingly competitive, agencies that have a requirement for local service may find a need to obtain local services more economically.

Vendor opportunities may exist for the provision of local-area services. With local-area network connectivity becoming increasingly important, opportunities may be found for development (and possibly management) of metropolitan-area networks (MANs) serving agencies in multiple facilities within the same area. While connectivity must be made to FTS 2000, neither US Sprint nor AT&T is able to provide local-area connectivity.

## 5. Timesharing Services

Some confusion persists on the role that FTS 2000 will play in the acquisition of timesharing services. GSA's decision to cancel the Teleprocessing Services Program at the end of FY 1990 aggravated this problem. It appears that some vendors will be allowed to use FTS 2000 in pricing their services, but INPUT does not expect its use to be mandatory. However, given the volatility of FTS 2000 scope issues, GSA may mandate other approaches.

The use of FTS 2000 becomes more complicated when one agency buys timesharing services from another. For example, the Labor Department does much of its data processing at the National Institutes of Health (NIH) computer center. The Department of Labor belongs to Network B (US Sprint), while NIH belongs to Network A (AT&T). It has not been determined which vendor will receive the business.

## 6. Additional Services

As reflected in MCI's protest over the toll-free service, one of the more serious questions facing many vendors is the extent to which new or enhanced services will be *automatically* included as part of FTS 2000.

INPUT believes that GSA will seek to include new or enhanced services in the FTS 2000 umbrella. GSA clearly views FTS 2000 as a baseline infrastructure to which services will be added as they become available. Although not specifically stated, vendors generally agree with this perspective. As discussed later, vendors note that one of the impacts of FTS

2000 is to shift their marketing focus from marketing to agencies to marketing to FTS 2000 service providers. Vendors believe that there will be increased emphasis in providing sets of bundled services through the FTS 2000 program.

## 7. Service Pricing

As evidenced by the intense competition for large federal contracts, pricing and costs are issues. FTS 2000 is no different. Articles appearing in trade journals suggest that, for specific services, AT&T and US Sprint's initial costs could have been anywhere from 30% to 80% higher than commercially available rates from the same companies. A methodology of establishing price caps now ensures that the government does not pay more than the commercially equivalent price.

Although cost and optimal price/performance must always be a consideration, the exact relevance of extensive discussion about costs may be a moot point. Because use of FTS 2000 is mandated and agencies are assigned to use either AT&T or US Sprint, there is little need to evaluate alternatives.

Agencies were assigned to either Network A (AT&T) or Network B (US Sprint) based on expected usage volume. Because US Sprint's initial prices were substantially higher than AT&T's, some problems had to be addressed. Since a 60/40 split in usage did not equate to a 60/40 revenue split, some agencies were reassigned. GSA developed a method of price leveling so that agencies assigned to one network would not pay more than those assigned to the other.

However, there is a need to ensure that agencies are receiving the best price/performance within the framework of the available services. To address the need, GSA has encouraged development of programs to let agencies evaluate the costs of alternative network designs. To date, several computer programs have become available.

- AT&T has developed a service to permit users of AT&T's FTS 2000 network to access its Service Analysis Tool. The program will permit users to obtain the latest information about service prices to meet specific requirements.
- SRA Telecommunications Inc. has developed a program called Pricer. Pricer permits analysis of costs for both voice and data for both the AT&T and US Sprint networks. The product is PC based and provides both batch and interactive capabilities. Pricer is reported to be available at a purchase price for a fully paid license of \$5,000 commercial or \$4,000 government. After the first year, maintenance is \$1,000 per year.



- I-NET distributes a program developed by Quintessential Solutions, Inc. Unlike SRA's product, I-NET's product is several network design modules, including FTS 2000 pricing. The product is PC based and is licensed for a minimum of \$7,000. There is an annual maintenance fee of \$4,500.
- Central Federal Systems, Inc. has developed an FTS 2000 engineering and planning service. The software was developed under GSA's TAMS contract. The bundled service is offered to both government agencies and systems integrators.

These products may be useful to system integrators who must bid FTS 2000 as part of their proposed solution.

Though billing, budgeting, and network optimization features are important to agencies, the greatest benefits of these programs will be to systems integrators. Determining optimal (data) network configuration is a complex analysis of price versus performance. With limited technical expertise, agencies developing complex systems will turn to systems integrators. The integrators will need tools to develop optimal network configurations.

In order to verify billing accuracy for the FTS 2000 network, GSA awarded Unisys a contract for an Automated Test Call Generator. The ten-year contract is for a mainframe computer, software and support.

GSA established an IT revolving fund financed by a 10% overhead charge paid by the FTS 2000 user agencies. This fund pays for all of GSA's administrative costs associated with the contract. This additional charge, in some cases, has raised the agency's costs for a particular service above the commercially available price. GSA addresses this issue on a case-by-case basis. After Congressional and GAO review of the IT revolving fund, GSA reduced the overhead charge to 7%.

There will be a price recompetition of FTS 2000 in 1992. This will be limited to the two current vendors. Because GSA has been very aggressive in negotiating price reductions during the life of the contract, it is unlikely that further major price reductions will occur. Also, MCI has maintained pricing pressure by offering services below the FTS 2000 pricing. However, it is likely that GSA and the vendors will use this opportunity to add additional services. A major difference in price between the two vendors could result in a reallocation of the current 60/40 revenue split. In the event of a reallocation, AT&T could win a maximum share of 76%. If US Sprint's share increases, the maximum would be 64%.

As part of the price recompetition, GSA will adjust the time and distance measures that affect pricing. In Congressional testimony, US Sprint has made additional requests.



- Make mandatory use permanent
- Maintain price leveling
- Maintain commerciality price caps
- Emphasize interoperability
- Clarify the basis for the award split ratio

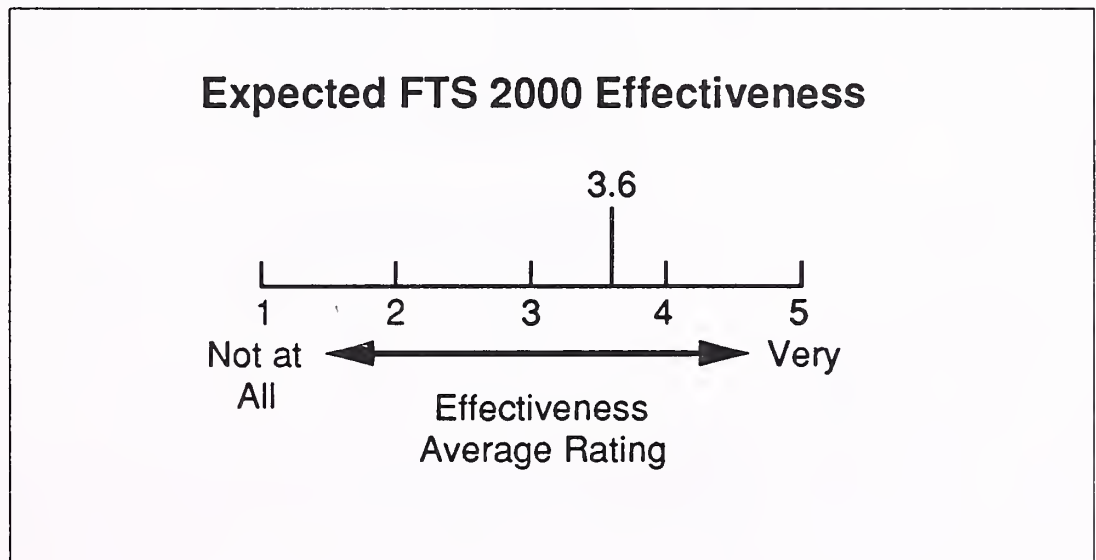
## D

### Agency Understanding And Acceptance

As noted in Chapter IV (Exhibit IV-1), if given a choice users would generally prefer to buy integrated telecommunications systems or buy services directly from common carriers. However, agencies recognize that, for the most part, they do not have a choice.

Considering that FTS 2000 is mandated as the method of meeting voice and data networking needs, agencies generally believe that FTS 2000 will meet their data networking needs through 1995, as shown in Exhibit V-1. However, there were a number of dissenting opinions that kept ratings from being higher.

EXHIBIT V-1



- Primary concern relates to the ability of FTS 2000 to successfully provide the breadth of data network requirements that users believe they will have over the next five years. Data network needs are expected to be the driving force behind growth in federal telecommunications services and, with a wide variety of needs, agencies are not convinced that FTS 2000 will be able to successfully address the wide variety of networking standards and protocols that exist.

- Agencies are also concerned about the costs of FTS 2000. While acknowledging that voice service costs will most likely be comparable to existing rates, there is a lack of specificity about costs for data network requirements. Without specifics about data networking costs, users are concerned that there might be some surprises.

Notwithstanding the concerns that have arisen, agencies expect to be users of FTS 2000 for both voice and data services over the next five years. As shown in Exhibit V-2, the number of agency-specific networks will decline sharply by 1995.

#### EXHIBIT V-2

### Networks Used to Meet Agency Data Network Requirements

Network Type	Average Percent of Network Requirements Met	
	Currently	By 1995*
FTS	11	0
FTS 2000	22	73
Agency-Specific	67	26

\*Totals do not equal 100% due to rounding.

Although agencies have concerns over features and costs, they believe that the service is fundamentally good and that issues will be resolved. They believe that most services will be available when they are required.

## E

### Vendor Perceptions

When considering the federal sector, vendors and users (agencies) are closely aligned in their beliefs about how effectively telecommunications are used in the federal government and the impact that FTS 2000 will have on vendors.

Vendors perceive that the federal government uses telecommunications with no greater than average effectiveness, as shown in Exhibit V-3. Agencies rated their own effectiveness almost the same, for nearly the same reasons.

## EXHIBIT V-3

### Vendor Perception of Federal Government's Effective Use of Telecommunications Systems and Services

Overall Rating*	Reasons	Percent of Responses
3.0	Lack of Technical Expertise	36
	Resources Used Inefficiently/ Duplicated	27
	Lengthy Procurement Process	18
	Distributed Processing Not Maximized	10
	Funding Problems	10
	Aging Technology	10

\*Rating scale 1 - 5, where 5 = very effective, 1 = not effective.

Note: Totals do not equal 100% due to multiple responses.

The agencies and vendors agree that a lack of technical expertise is a key reason that telecommunications technology is not used more effectively. The agencies consider funding problems to be a higher contributor to the problems than do vendors. This is understandable, since many vendors do not understand the complexity of the federal funding process.

When considering the impact that FTS 2000 will have on vendors, INPUT believes that the impact will be perceived to be more significant than vendors reflect. As shown in Exhibit V-4, vendors rated the overall impact to be less than high.

## EXHIBIT V-4

**FTS 2000 Impact on Vendors**

Overall Rating*	FTS 2000 Impact on Vendors
3.69	<p>Defines Connectivity Products</p> <p>Shift Marketing to Bundled/ Embedded Procurements</p> <p>Shift Marketing to FTS 2000 Vendors</p> <p>Market is Larger</p> <p>Less Revenue for Other Vendors</p>

\*Rating scale 1 - 5, where 5 = major effect, 1 = no effect.

- While carriers rated the impact high or very high, providers of software, hardware, and other services rated the revenue impact at the bottom of the list. The majority of the impacts centered around the approach to marketing products and services, not the opportunity potential.
- Rating the definition of connectivity products at the top of the list, by frequency of mention, vendors are also reflecting a stabilization of the market. With the primary network providers now defined, vendors are able to better understand standards and identify products that will successfully connect with the network.
- Vendors reflect also that with the direction of FTS 2000 now established, the overall market could actually grow. Many agencies have held plans in abeyance pending the outcome of FTS 2000 decisions. Agencies are now moving forward.

Vendors generally view FTS 2000 in the same way as do agencies. They rate its effectiveness as high, as shown in Exhibit V-5. The primary reason that the rating is not higher is due to a perceived limitation in the number of services. However, most vendors also agree that the base of services is sufficiently broad to meet the needs of most agencies.



## EXHIBIT V-5

**FTS 2000 Effectiveness Through 1995**

Overall Rating*	Reasons	Percent of Respondents
3.69	Is Limited in Services	46
	Provides Almost All Needs	15
	None	39

\*Rating scale 1 - 5, where 5 = extremely effective, 1 = not effective at all.

Though members of the vendor community generally believe they can work within the framework set by the presence of FTS 2000, they also believe that FTS 2000 and federal budget cuts are the two most significant inhibitors to their realizing greater potential from the federal market, as shown in Exhibit V-6.

## EXHIBIT V-6

**Vendor Perceptions of Market Inhibiting Factors**

Market Inhibitors	Percent of Respondents
FTS 2000	50
Federal Budget Cuts	50
Acquisition Process	25
Contract Durations	25

Note: Multiple responses permitted.

**F****Prospects for Vendors**

INPUT believes that FTS 2000 will have both positive and negative impacts on vendors. Key negative impacts will be on providers of basic voice services such as common carriers and providers of other voice-based services. However, even within the area of voice services there are potential opportunities.

Key positive impacts will be in the provision of data related services. With FTS 2000 now implemented, agencies that have been holding back on data network plans are moving forward to develop improved networking services. While data must be transported over the FTS 2000 network, agencies are free to develop systems and interfaces to meet their needs.

The following provides a summary of areas in which INPUT believes there could be increased or decreased opportunities. Note that the majority of the increased opportunities fall within the general area of data networking.

- Few, if any, opportunities are expected to be in the provision of basic voice services. With AT&T and US Sprint providing interexchange services and local carriers providing the majority of local-area services, there appear to be few major opportunities. Likewise, since FTS 2000 requires the availability of SS7 digital-based service, many enhanced voice services will be available as part of FTS 2000.
- One voice-related service that has grown significantly in the private sector and could afford opportunities in the federal sector is voice messaging systems. Voice messaging is not specified as a requirement of FTS 2000 and, since the service is implemented locally, it would generally fall outside the context of the FTS 2000 contract. With federal agencies seeking to increase service, voice messaging could offer opportunities to increase customer service.
- There are two other areas in which INPUT believes there are potentially significant opportunities for vendors.
  - The first relates to local-area networks. Agencies are placing increased emphasis on integrating disparate local-area networks and, for agencies with offices throughout the country, connection to FTS 2000 is necessary. Software and hardware that will provide connectivity between LANs and FTS 2000 should be in high demand over the next several years.

- The second relates to the interface of the wide variety of network standards and protocols of existing agency-specific networks with FTS 2000. Although many agencies expect FTS 2000 to meet wide-area networking needs, an extended period of time will be necessary for common standards to be implemented. In the meantime, hardware and software products that link old and new products and services will be needed.

GSA has identified six government-wide potential procurements for services not included in the FTS 2000 contract.

- International switched-voice service
- International data transmission
- Encrypted service
- Compressed video service
- Mobile cellular service

Separately, GSA identified services that agencies should acquire outside of the FTS 2000 contract. These include calling card privileges, dedicated transmission circuits with tariffed services, and long-distance services supplied to small federal locations by primary interexchange carriers. Newer high-speed data services that are currently outside the contract include SONET, frame relay and bandwidth-on-demand.

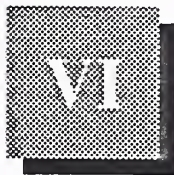
Successful vendors will be those that are able to adjust their sales and marketing approaches. They will recognize that multiple marketing efforts are now required.

- Vendors will need to provide increased education to federal agencies. Providing education will increase their visibility as a quality provider and will ensure understanding of how the vendor's products interact with FTS 2000.
- Adjustments need to be made to marketing strategies and tactics. Successful vendors will develop marketing strategies directed toward supporting and interacting with AT&T and US Sprint (FTS 2000) products and services.

FTS 2000 will clearly have an impact on providers of basic services. However, there will be increasing opportunities for providing connectivity products and enhanced network services.







## Competitive Trends

### A

#### The Marketplace

---

As explained in Chapter III, INPUT has broken the federal telecommunications market into four segments:

- Leased telecommunications services
- Telecommunications equipment (hardware)
- Telecommunications professional services (made up of telecommunications maintenance services and telecommunications technical support)
- Network services

In its competitive analysis, INPUT has further divided the first three of these segments into single and bundled subsets. (Note that the federal supply codes do not lend themselves to an analysis of network services as INPUT defines it. Network services are generally included as part of leased telecommunications services.)

Vendors and values appearing in a single market segment represent contract actions that contain only the Federal Supply Codes (FSCs) for products and services that define that market segment. The bundled market segments contain contract actions that involve at least one of the selected Federal Supply Codes as well as any other Federal Supply Code or Codes.

For example, a single contract for leased telecommunications services should contain *only* the FSC for leased telecommunications services, and nothing else. A bundled contract in the same segment would include the FSC for leased telecommunications as well as other FSCs for anything from computer security equipment or other ADP supplies to X-ray equipment or garbage collection services.

As one might expect from the example, each of the segments that make up the federal telecommunications market contains a percentage of single and a percentage of bundled contract actions. The following exhibits show the single versus bundled breakout for each market segment or subsegment. Analyzing the composition of each market segment helps to contrast the concentration of funding for specialized product or service contracts (single) with funding spent on contracts for multiple products and services (bundled). With knowledge of the contract types, vendors may better select the market segments that will offer the greatest opportunities.

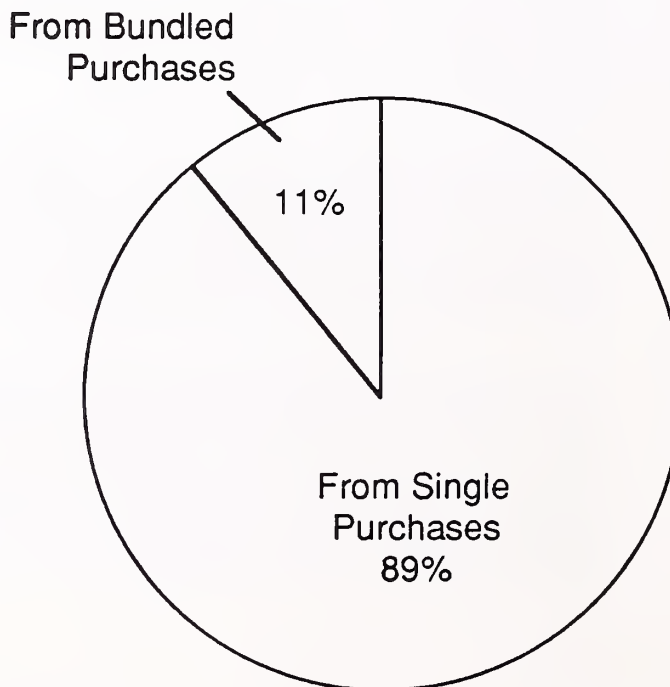
### 1. Leased Telecommunications Services

Exhibit VI-1 shows the percentage of total federal leased telecommunications service obligations that originated through single and bundled contracts. The total represents all obligations for federal leased telecommunications for fiscal year 1990. Single purchases of these services accounted for 89% of all obligations for the period. Obligations resulting from bundled contracts accounted for 11% of the total. Of the bundled contracts, approximately 22% of the obligations are for related products and services.

Note that, for the purpose of this calculation, amounts related to other obligations have been eliminated since other obligations may not relate to telecommunications services. The calculation therefore directly compares the percentage of services derived from single contracts and that derived from bundled contracts.

EXHIBIT VI-1

#### Leased Telecommunications—Percent Single versus Bundled Contracts, FY 1990



Note also that, in INPUT's previous 1990 report, single purchases in FY 1987-1988 represented 62% of the total for this segment. INPUT believes that the shift results primarily from a bundled DISA contract valued at more than \$400 million. In FY 1990, the DISA contract was eliminated from consideration and the percentage of single purchases has returned to the very high percentage shown in earlier reports.

Exhibit VI-2 shows the top three other products and services purchased through the same contract as leased telecommunications. The percentage represents the proportion of this product or service as a percent of the total other products and services.

## EXHIBIT VI-2

**Leased Telecommunications  
Top Three Other Products/Services, 1990**

Rank	Product/Service Mode	Percent of Total Bundled Segments
1	Communications Security Equipment and Computers	23
2	Maintenance/Repair of Aircraft	19
3	Lease/Rent of Communications Equipment	18

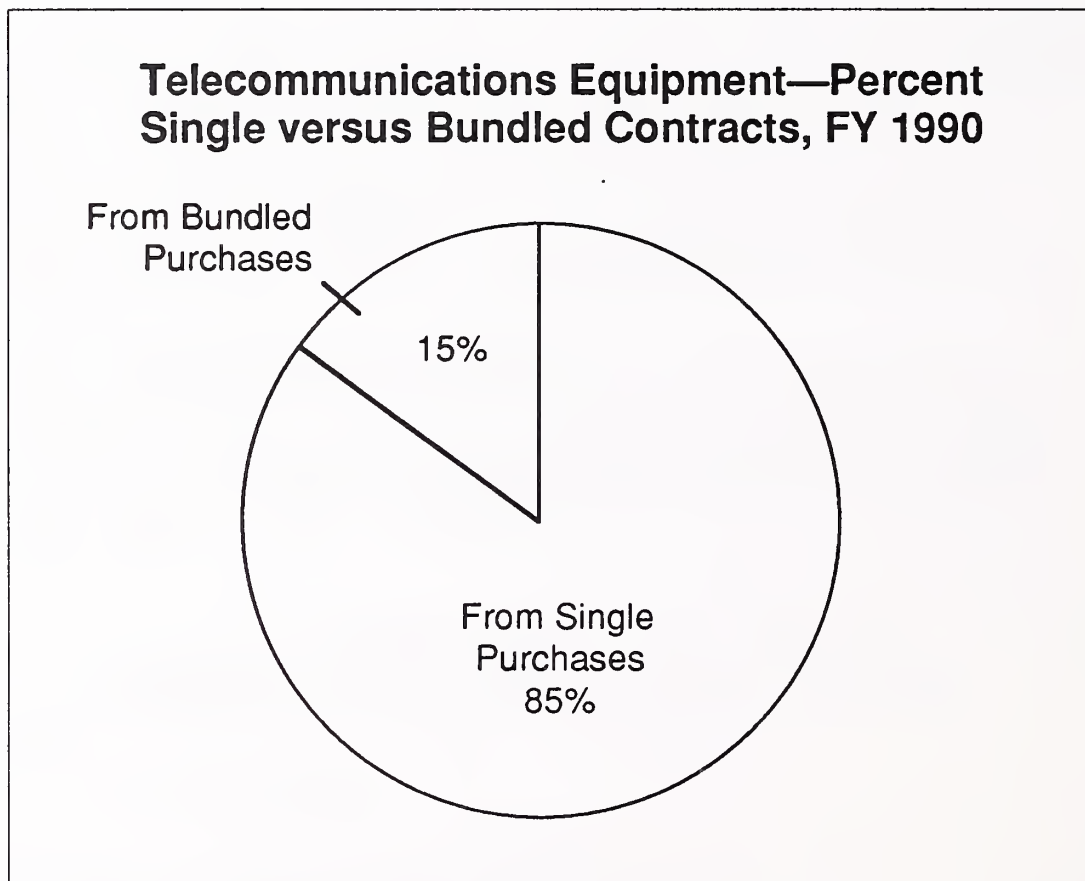
In the bundled market, communications security equipment and computers accounted for the greatest percentage. Note that in INPUT's previous report, communications security equipment and computers represented only 9% of the total. This suggests increasing emphasis on security of communications and computing services.

The next two most popular products and services purchased with leased telecommunications contracts were maintenance/repair of aircraft at 19% and lease/rent of communications equipment at 18%.

## 2. Telecommunications Equipment

The split between single and bundled obligations for telecommunications equipment is shown in Exhibit VI-3. In this market, single contract actions accounted for 85% of the total funding for FY 1990. The total for bundled contracts represented 15% for the same period. Note that, for the purpose of this calculation, amounts related to other obligations have been eliminated, since other obligations may not relate to telecommunications equipment. The calculation therefore directly compares the percentage of telecommunications equipment derived from single contracts and that derived from bundled contracts.

EXHIBIT VI-3



The telecommunications equipment market may be successfully approached through either contracting strategy. However, the most cost-effective method for market penetration appears to be through single contract actions.

As shown in Exhibit VI-4, in the other category, the greatest requirement was for fixed wing aircraft equipment, representing 19% of the total of related equipment acquired under bundled contracts. This was followed by guided missile systems, 18%, and ADPE system configuration.



## EXHIBIT VI-4

**Telecommunications Equipment  
Top Three Other Products/Services, FY 1990**

Rank	Product/Service Mode	Percent of Total Bundled Segments
1	Aircraft—Fixed-Wing	19
2	Guided Missile—Complete	18
3	ADPE System Configuration	9

The nature of these other items indicates that much of the telecommunications equipment acquired by the federal government is purchased not only through single contracts, but also through contracts heavily involved with aircraft avionics suites and aircraft assembly items.

### 3. Telecommunications Technical Support Services

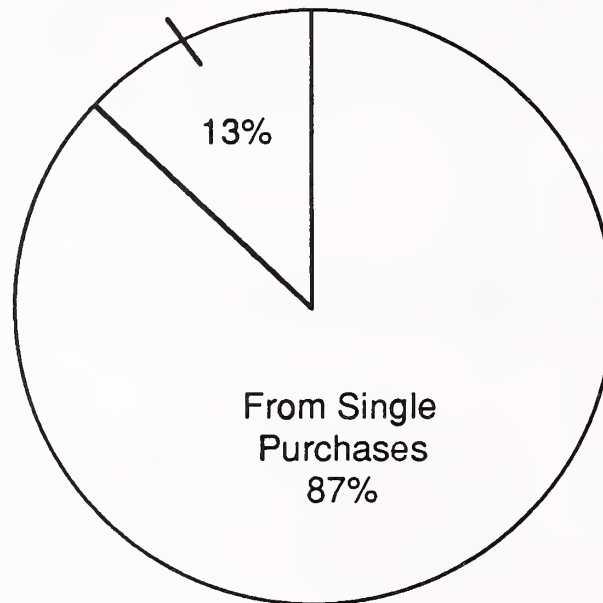
Exhibit VI-5 indicates that single contract actions represent 87% of the total telecommunications technical support services obligations. Bundled contract actions account for 13% of the funding for these services. As in other markets, single contract actions outweigh bundled contracts in their contribution to total federal contract obligations. In many instances, telecommunications technical support services are purchased through a specific contract for technical support, completely separate from contracts for other equipment and services.

Note that, for the purpose of this calculation, amounts related to other obligations have been eliminated, since other obligations may not relate to telecommunications technical support. The calculation therefore directly compares the percentage of technical support derived from single contracts and that derived from bundled contracts.

## EXHIBIT VI-5

### Telecommunications Technical Support—Percent Single versus Bundled Contracts, FY 1990

From Bundled  
Purchases



The top other category purchased as part of bundled contracts was for ADPE system configuration services, as shown in Exhibit VI-6.

## EXHIBIT VI-6

### Telecommunications Technical Support Top Three Other Products/Services, FY 1990

Rank	Product/Service Mode	Percent of Total Bundled Segments
1	ADPE System Configuration	51
2	Maintenance/Repair of Aircraft	6
3	Operation of Government Missile Systems Facilities	6

Maintenance/repair of aircraft was once again in the list of other items purchased under bundled contracts. This represented 6% of the total. This was followed by operation of government missile systems facilities, also representing 6% of the total.

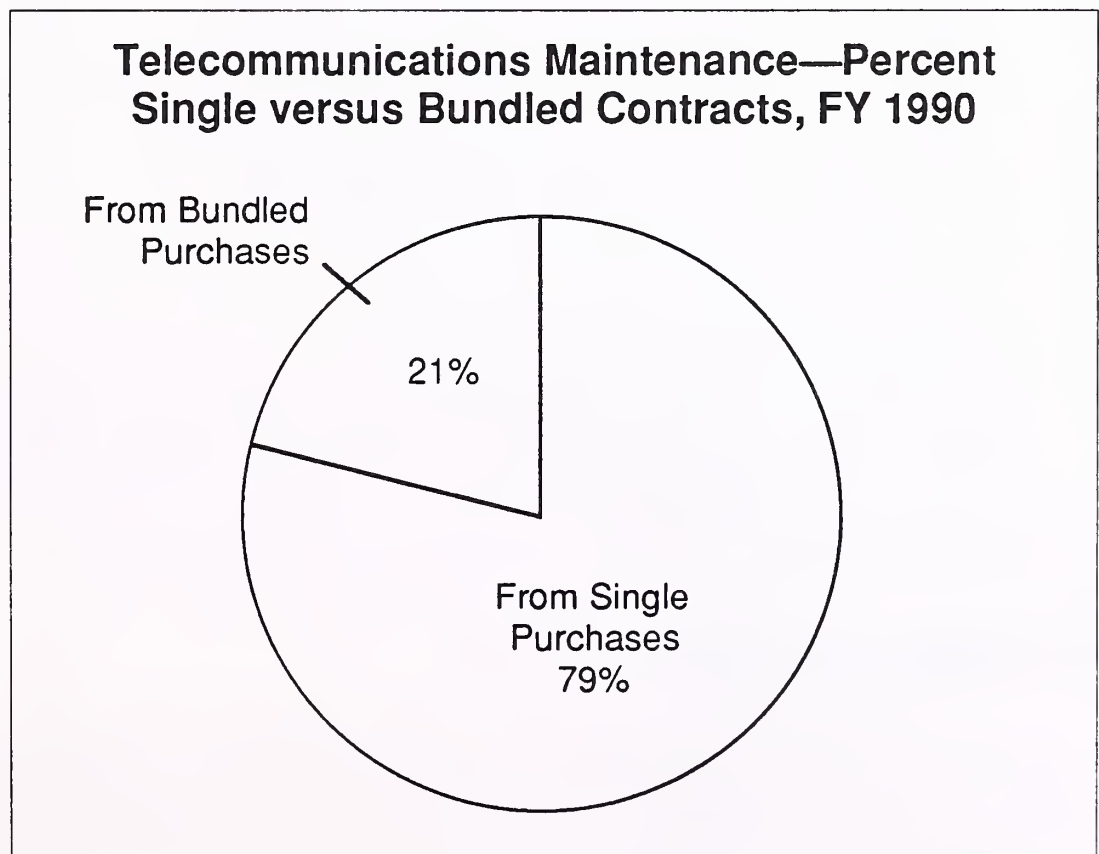
The high ranking of ADPE system configuration is not an oddity. It is closely related to telecommunications technical support services. However, heavy purchases of operations for aircraft and missile facilities services show the bundled market for telecommunications technical services skewed toward contracts aimed at areas outside the scope of the market. In particular, weapons systems appear to play a major role in the market for telecommunications technical support.

#### 4. Telecommunications Maintenance Services

Exhibit VI-7 shows the proportion of obligations for federal telecommunications maintenance services through single and bundled contract actions. Single purchases of maintenance services accounted for 79% of all obligations. Bundled contract actions represented 21% of the total.

Note that, for the purpose of this calculation, amounts related to other obligations have been eliminated, since other obligations may not relate to telecommunications maintenance support. The calculation therefore directly compares the percentage of maintenance derived from single contracts and that derived from bundled contracts.

EXHIBIT VI-7



As in other markets, single contracts represent the most cost-effective method of providing telecommunications maintenance services to the federal government. Such a low proportion of funding for single contracts may be related to the wide variety of telecommunications equipment that is purchased with maintenance services included. Nonetheless, the high percentage of single contract obligations also allows vendors to enter this market, not through an equipment sale, but through a maintenance sale, either for their own equipment, or as a third party.

Exhibit VI-8 shows the percentage of federal obligations that were spent on the top three other products and services in bundled contracts. The top category in bundled contracts was for fixed-wing aircraft maintenance, representing 58% of the total. This was followed by maintenance of airborne radar equipment (7%) and the provision of miscellaneous aircraft accessories and components.

EXHIBIT VI-8

**Telecommunications Maintenance  
Top Three Other Products/Services, FY 1990**

Rank	Product/Service Mode	Percent of Total Bundled Segments
1	Aircraft—Fixed-Wing	58
2	Radar Equipment—Airborne	7
3	Misc. Aircraft Accessories/ Components	4

This collection of other service categories indicates that the government purchases a wide range of services through telecommunications maintenance contracts. Many of the contracts have little direct relationship to the maintenance of telecommunications equipment.

## B

### Federal Telecommunications Vendors

The federal telecommunications market is highly fragmented, with over a hundred vendors achieving revenues of over \$10 million in FY 1990. The top 10 vendors by total revenue are listed in Exhibit VI-9.



## EXHIBIT VI-9

**Top 10 Vendors**  
**Total Telecommunications Market, 1990**

Company	Amount (\$ Millions)	Market Share (Percent)
GTE	1,024	26
AT&T	436	11
Raytheon	319	8
Alcatel SA	248	6
GM	156	4
Boeing	121	3
Mitek	111	3
Unisys	82	2
Harris	65	2
TRW	64	2
All Others	1,363	33

GTE dominates the market share, primarily because of DoD-related telecommunications equipment sales. Although AT&T ranks second, because of FTS 2000, it will be losing some market share to US Sprint. US Sprint will break into the top 10 list once FY 1992 data becomes available. With the purchase of Rockwell International's Network Transmission Systems Division, Alcatel SA ranks fourth in market share. General Motors (GM) participates in the market through its Electronic Data Systems (EDS) and Hughes Electronics divisions.

Because this is a very large market, it is very important to analyze segments and subsegments. Many companies participate in only one subsegment or through only one contract. Each of the market segments for telecommunications contains its own unique set of competing vendors and top performers. The following sections discuss the performance of the top telecommunications vendors in each federal government market segment for FY 1990.

## 1. Leased Telecommunications Market

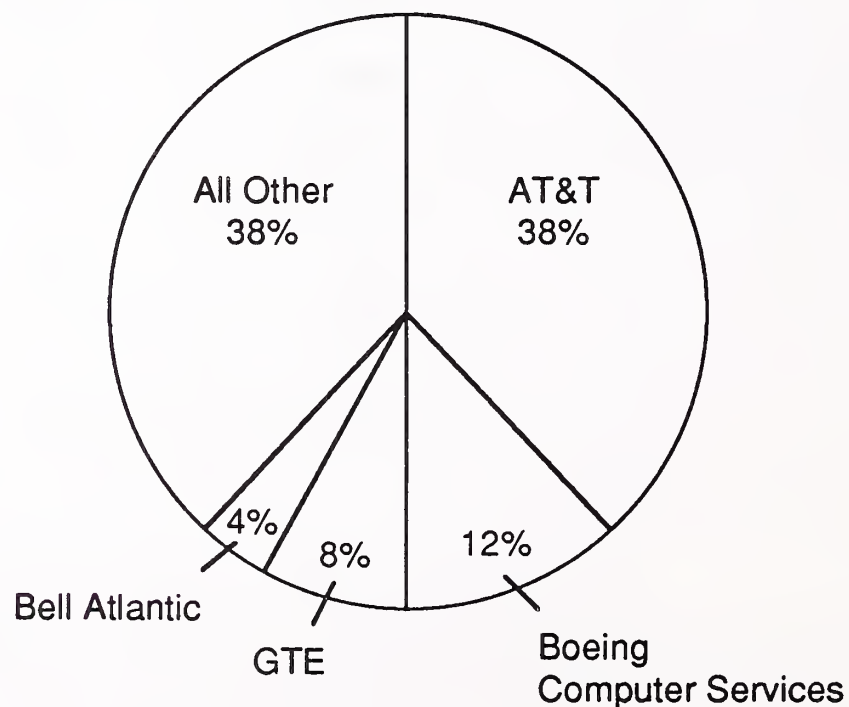
The leased telecommunications market segment includes all services included under Federal Supply Code S113. This supply code refers specifically to utilities, telephone and/or communications.

Within the segment, vendors of services under single-service contracts sell only S113 services. Vendors of bundled services sell some S113 services as well as a broad range of other products or services that may be included under a single contract.

As shown in Exhibit VI-10, the top vendor for leased telecommunications services has been AT&T for the past four years, with an average market share of 37%. However, this represents a reduction from AT&T's previous share of 44%, for the period 1984-1987.

EXHIBIT VI-10

**Top Four Vendors and Market Shares  
Leased Telecommunications, Fiscal Year 1990**



AT&T's standing as the leader is no surprise to followers of the federal leased telecommunications market. However, with the awarding of FTS 2000, AT&T's overall share of the federal market is expected to decline. While AT&T was awarded 60% of the FTS 2000 contract, US Sprint has received a significant portion of what was primarily AT&T revenue. INPUT expects further consolidation and gain in market share by the larger vendors.

Analysis of the market for leased telecommunications services indicates two significant facts. Following AT&T, the next three market leaders account for no more than 24% of the total federal market for leased telecommunications services. The remaining 38% is divided among a wide variety of local service providers and smaller companies providing specialized services.

With the awarding of FTS 2000, the market for leased telecommunications services will be significantly controlled by two companies, AT&T and US Sprint. And following AT&T and US Sprint, there may be only limited opportunities. With BOCs providing the majority of local services, there may be only limited opportunities for leased telecommunications services.

The exception will be the provision of leased telecommunications services to federal departments that have been exempted from using FTS 2000. Strong competition should be expected for the provision of leased telecommunications services. Even those exemptions may be short lived as the capability and scope of technology available under FTS 2000 increases.

The leading vendors of leased telecommunications services derive their revenue nearly equally from single and bundled contracts, as shown in Exhibit VI-11. From the data, it is clear that major providers in the telecommunications services market compete equally for single and bundled contracts. All of AT&T's bundled contracts were from the Department of Defense and represented 49% of AT&T's DoD revenue. Also, all of GTE's and Bell Atlantic's bundled contract revenues were from DoD. All of Boeing's revenue was from NASA.

## EXHIBIT VI-11

### Top Four Vendors—Leased Telecommunications Single/Bundled Revenues, FY 1990

Vendor	Percent	
	Single	Bundled
AT&T	69	31
Boeing Computer Services	100	-
GTE	94	6
Bell Atlantic	99	1



## 2. Telecommunications Equipment Market

The telecommunications equipment market segment includes a wide variety of Federal Supply Codes. A large number of codes is necessary to ensure complete coverage of this complex market segment. The following Federal Supply Codes are included in the federal telecommunications market.

- 5805 Telephone and Telegraph Equipment
- 5810 Communications Security Equipment and Components
- 5811 Other Cryptologic Equipment and Components
- 5815 Teletype and Facsimile Equipment
- 5820 Radio and TV Equipment, Except Airborne
- 5821 Radio and TV Equipment, Airborne
- 5825 Radio Navigation Equipment, Except Airborne
- 5826 Radio Navigation Equipment, Airborne
- 5830 Intercomm Public Address Systems, Except Airborne
- 5831 Intercomm Public Address Systems, Airborne
- 5850 Visible/Invisible Light Communications Equipment
- 5895 Miscellaneous Communication Equipment
- 5985 Antennas, Waveguides, and Related Equipment
- 5995 Cable Cord Wire Assembly - Communications Equipment
- 60xx Fiber Optic Conductor, Cables, Assemblies, Devices  
Interconnectors, and other Accessories
- 6145 Electric Wire and Cable
- 6940 Communication Training Devices

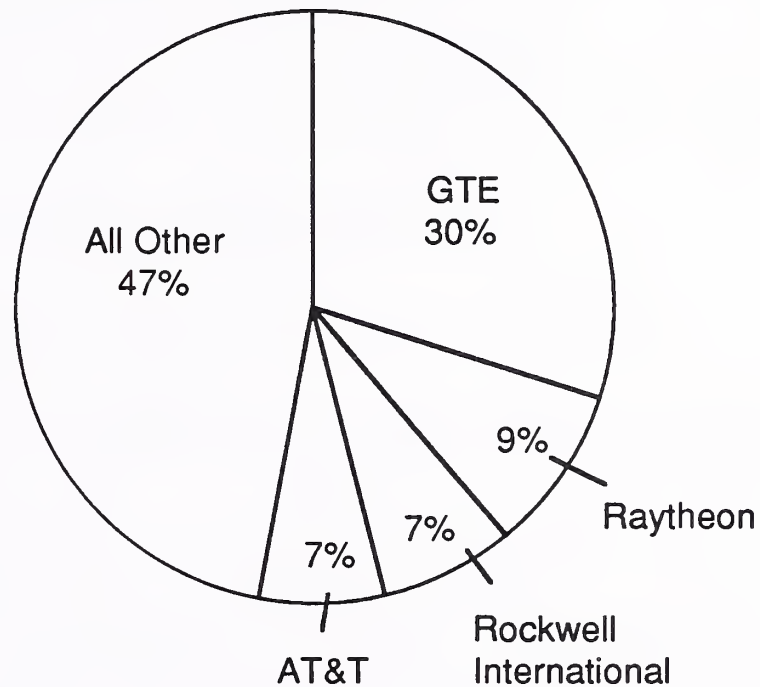
Note: In the interest of completeness, purchases relating to any of these codes have been included in the study. However, many of these products are not included as part of the total federal information technology budget (A-11 43A). INPUT bases its telecommunications market forecast on the A-11 43A document.

The leading four vendors in the federal telecommunications equipment market are shown in Exhibit VI-12. Unlike the leased telecommunications services market, the telecommunications equipment market is not dominated by any single vendor. The leading vendor, GTE, holds a 30% market share but virtually all of its revenue was from the U.S. Army.

The leader, GTE, is followed by three vendors that, collectively, account for no more than 25% of the total market. Revenues of 47% of the market are distributed across a wide variety of vendors. All of Raytheon's revenue was from the U.S. Air Force. Compared to the FY 1987-1988 data, GTE, Raytheon, AT&T and Rockwell improved their market share at the expense of IBM, United Phillips Trust and Motorola. In mid-1991, Alcatel SA purchased Rockwell International's Network Transmission Systems Division.



## EXHIBIT VI-12

**Top Four Vendors and Market Shares  
Telecommunications Equipment, Fiscal Year 1990**

Over the next five years, new growth areas in the single telecommunications equipment market will include at least the three following federal supply groups:

- Any related fiber optics equipment and supplies
- Facsimile Equipment
- Communication Security Equipment

The fiber equipment and supply market will continue to grow as federal agencies begin to realize the increased capabilities of a wideband communications medium. As GOSIP protocols receive approval from the National Institute of Standards and Technology and as ISDN capabilities become a popular method of information transmission, the federal government will be pressured to develop fiber optic capabilities to keep pace.

As increased numbers of large, sophisticated communications networks become commonplace in the federal government, requirements for communications security equipment will increase. Substantially increased emphasis on communication security is coming from both OMB and Congress.

Exhibit VI-13 summarizes the percentage of revenues that each of the leading four vendors receive from single and bundled contracts. The data indicates that single contracts are the preferred method of entering into equipment contracts. However, the fact that the leading four vendors receive 46% of the revenues for telecommunications equipment suggests that there is ample opportunity for other vendors of equipment to meet specific needs.

## EXHIBIT VI-13

### Top Four Vendors, Telecommunications Equipment Single/Bundled Revenues, FY 1990

Vendor	Percent	
	Single	Bundled
GTE	1	99
Raytheon	98	2
Rockwell International	92	8
AT&T	92	8

INPUT believes that growth areas for telecommunications equipment will be the following:

- Fiber optics equipment and supplies
- Facsimile equipment
- Communications security equipment

However, since many of these products are included as part of bundled contracts, their purchase will originate from contracts "related" to telecommunications equipment. In other cases, the focus of the contract may not be telecommunications equipment at all. These related (and unrelated) contracts allow vendors without strong telecommunications equipment capabilities, especially in the areas listed above, to enter the market through other means.

### 3. Telecommunications Professional Services: Telecommunications Maintenance Services and Technical Support

For this analysis, the telecommunications professional services market includes data from two services segments: telecommunications maintenance services and telecommunications technical support. As in other market segments, the professional services segment includes a wide variety of Federal Supply Codes. The data from FY 1987-1988 is the most current available for this market subsegment.

Telecommunications maintenance services include:

- H158 Quality Control of Communications Equipment
- H258 Equipment Test Services
- H358 Inspection Services
- J058 Maintenance and Repair of Communications Equipment
- J060 Maintenance and Repair of Fiber Optics Materials and Equipment
- K058 Modification of Communications Equipment
- K060 Modification of Fiber Optic Equipment
- L058 Technical Representative Services: Communications
- L060 Technical Representative Services: Fiber Optics
- N058 Installation of Communications Equipment
- N060 Installation of Fiber Optic Material

Telecommunications technical support includes:

- M127 Operation of Government Electronic and Communications System Facility
- R304 ADP Services and Data Transmission
- R426 Professional Services: Communications Services
- R553 Communications Studies
- Y127 Construction of Electronic and Communications Systems and Facilities
- Z127 Maintenance, Replacement, and Alteration of Electronic and Communication System Facilities

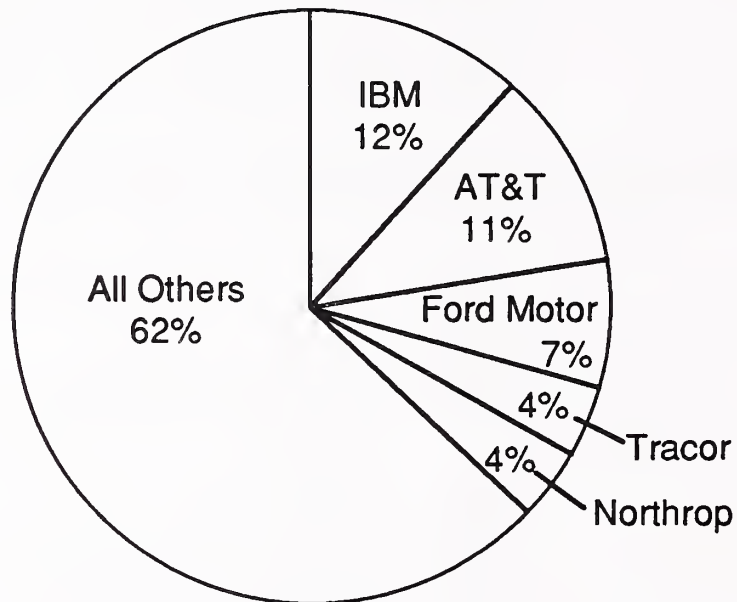
Also, like other segment analyses, both of these segments will be further broken into single and bundled markets. Taken as a set, the single and bundled telecommunications maintenance market and the single and bundled telecommunications technical support market will make up the telecommunications professional services segment of this report.

#### a. Telecommunications Maintenance Services Market

As shown in Exhibit VI-14, two vendors, AT&T and IBM, share the top ranks of the single telecommunications maintenance services market. These cover contracts that involve at least one of the FSCs above and are primarily single contracts.

EXHIBIT VI-14

### Top Five Vendors and Market Shares Telecommunications Maintenance Fiscal Years 1987-1988



As can be noted from the exhibit, there are many vendors providing maintenance services. For FY 1987-1988, the five leading vendors realized only 38% of the total market.

Aside from the consistent performance of AT&T, IBM and Ford Motor, many vendors appear only once or twice. In fact, of the ten different vendors who ranked in the top five over the past five years, half appear only once. These four one-year showings were made by Raytheon in 1984; General Electric in 1985; and Allied Signal and SAIC in 1987.

Such a high rate of vendor appearances in only one year may indicate a highly competitive and volatile market, in which a comparatively few awards can change the top rankings from year to year. IBM's high revenues from telecommunications maintenance most likely involve subcontracting and OEM activities in areas such as maintenance and repair of communication equipment, technical representative services, or even installation of communications equipment. In the future, the most successful vendors in this market will be those that are able to translate contracting activity in related telecommunications areas into follow-on maintenance contracts for the subsequent years. Maintenance vendors also have the ability and opportunity to recommend or supply upgrade/replacement products.



Like the telecommunications equipment market, vendors in the telecommunications maintenance market derive the majority of their revenues from single contracts, as shown in Exhibit VI-15. In total, approximately 78% of the revenues of the top five vendors are derived from single contracts.

EXHIBIT VI-15

### Top Five Vendors, Telecommunications Maintenance Single/Bundled Revenues, 1987-1988

Vendor	Percent	
	Single	Bundled
IBM	70	30
AT&T	100	-
Ford Motor	35	65
Tracor	96	4
Northrop	87	13

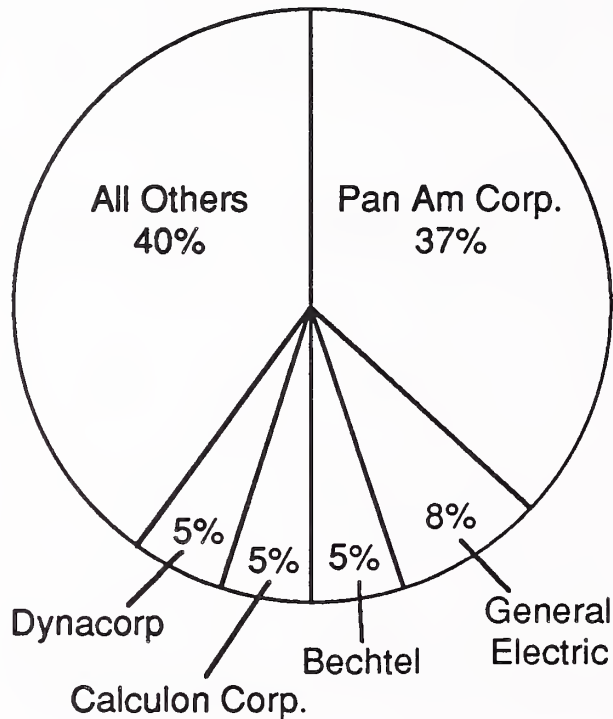
#### b. Telecommunications Technical Support Market

The second segment included in the telecommunications professional services market covers contracts for telecommunications technical support. The Federal Supply Codes included in this section are listed at the opening of the professional services section.

The top vendors for the telecommunications technical support segment are listed in Exhibit VI-16. Again, these vendors have received revenues only for products listed in the FSCs above for technical support.

The uncontested leader in this market for single telecommunications technical support is the airline Pan Am. This leadership is at least partly explained by the fact that Pan Am has subsidiaries such as TGS Technology, Inc. and Pan American Electronics, Inc., which are apparently becoming increasingly involved in the federal telecommunications technical support market. In January 1992, Pan Am filed for protection under Chapter 11 of the Bankruptcy Act.

## EXHIBIT VI-16

**Top Five Vendors and Market Shares—Telecommunications Technical Support, Fiscal Years 1987-1988**

Following Pan Am, leading vendors in providing telecommunications technical support hold only small shares of the market. Forty percent of the market is divided among many smaller vendors, each providing specialized support for specific products or meeting specific market needs.

Continuing the trend of telecommunications equipment and maintenance, the leading vendors receive the majority of their revenues from single contracts, as shown in Exhibit VI-17.

## EXHIBIT VI-17

### Top Five Vendors, Telecommunications Technical Support Single/Bundled Revenues, 1987-1988

Vendor	Percent	
	Single	Bundled
Pan Am Corp.	100	-
General Electric	98	2
Bechtel	100	-
Calculon Corp.	100	-
Dynacorp	25	75

## C

### Vendor Federal Telecommunications Market Plans

The following discussion examines the factors that can affect the success of a vendor in the federal telecommunications market.

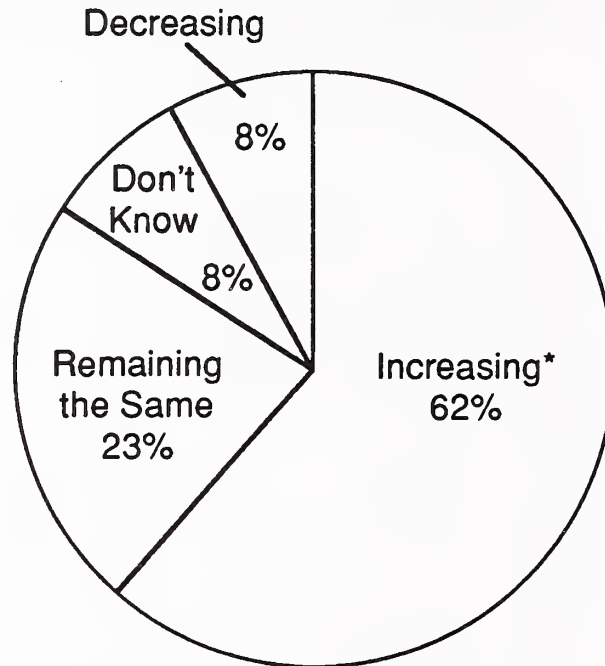
#### 1. Market Direction

The market for telecommunications services will continue to grow. As shown in Exhibit VI-18, 62% of vendors believe that the market for telecommunications services continues to grow. Only 8% think that it will decline.

The rate of growth is open to question. Agencies are generally not able to predict the rate of growth. Vendors believe that the market will grow at 19% for the next several years. Though agencies were not able to identify a specific growth rate, they believe that the primary growth will occur in several areas.

## EXHIBIT VI-18

### Vendor Perception of Federal Telecommunications Market Directions



\*Average increase indicated: 19%.

- 42% of the agencies believe that spending for voice services will increase. However, an equal number believe that spending for voice services will decrease. The remainder believe there will be no change.
- 73% of the agencies believe that spending for leased circuits will increase. Only 18% believe that spending will decrease.
- 80% of the agencies believe that spending for value-added network services will increase. None think that spending for value-added network services will decrease. The primary requirement for value-added network services is for electronic mail. On a scale of 1-5, with 1 being low, users rate the importance of electronic mail at 4.3, suggesting that electronic text communication is important to nearly all agencies.
- 78% of the agencies believe that spending for hardware will increase. None think that spending will decrease.
- 78% of the agencies believe that spending for software will increase. Only 11% think that spending will decrease.



## 2. Growth Factors

There are several factors that will cause growth in the federal market for telecommunications. Vendors identified eight different factors that they believe will cause the market to grow. Of the eight factors, specific agency requirements was the most frequently mentioned, by a considerable degree.

As shown in Exhibit VI-19, overall growth in network use, the availability of new technology, and standards integration were perceived by vendors as considerably less important.

EXHIBIT VI-19

Vendor Perceptions of Market Growth Factors	
Market Drivers	Percent of Responses*
Specific Agency Requirements	46
Increasing Network Use	19
New Technology Availability	19
Standards and Protocols Integration	19
General Automation Increases	9
Aging Equipment Upgrades	9
FTS 2000	9
Cost Decreases	9

\*Does not add to 100%—multiple responses allowed.

## 3. Agency Opportunities

As vendors consider opportunities for telecommunications products and services within the federal government, the Department of Defense continues to head the list as offering the greatest opportunities. While vendors rate civilian agency opportunities comparably, there are a greater number of civilian agencies. Exhibit VI-20 summarizes vendors' perceptions of the departments and agencies that offer the greatest opportunities.

## EXHIBIT VI-20

### Agencies Offering the Most Telecommunications Opportunities

Agencies	Percent of Responses*
DoD	36
Civil	36
Transportation/FAA	27
Agriculture	18
NASA	18
Treasury	18
Security/Intelligence	18
U.S. Postal Service	18
GSA	18
State	18
Air Force	9
Navy	9
HHS	9
Justice	9
Energy	9
EPA	9

\*Does not add to 100%— multiple responses allowed.

#### 4. Preferred Acquisition Methods

As shown in Exhibit VI-21, there is considerable difference of opinion between vendors and agencies about the preferred method of acquiring telecommunications services. (Responses for this exhibit resulted from a question about the preferred method of acquiring telecommunications services—if they had free choice. The requirement to use FTS 2000 was noted to respondents. They were asked to provide their opinion, assuming that use of FTS 2000 was not a requirement.)

From the responses, several points become clear.

#### EXHIBIT VI-21

### Vendor Perceptions of Agency Preference for Acquiring Telecommunications Systems and Services

Acquisition Preference	Ranking*	
	Vendor	Agency
Buy Integrated Systems	1	1
Buy VAN Services	2	4
Vendor Integrate Agency-Bought Components	3	5
Use GSA or DISA Facilities	4	3
Buy Common Carrier-Provided Services	5	2
Agency Buys Components and Integrates In-house	6	6

\*Rank based on average ratings by respondents.

For a variety of reasons, primarily related to staffing, most agencies have no desire to develop and integrate telecommunications. Both vendors and agencies rate this method of acquisition at the bottom of the list.

Vendors and agencies agree that buying integrated systems would be the preferred method of meeting agency needs, if agencies had a free choice. Though vendors and agencies agree on the most and least desirable methods of acquisition, there is considerable difference of opinion about other options.

The ranking of preferred methods suggests strongly that agencies prefer to buy services from common carriers rather than value-added network service providers. Vendors perceive that the opposite is true.

Vendors and agencies rate the use of GSA- or DISA-provided facilities nearly equally. However, the opinion of agencies has changed somewhat over the past two years. In INPUT's previous report, agencies ranked the use of GSA or DISA facilities as fifth out of the six categories. The change suggests confidence that FTS 2000 will better meet agency requirements.

## **5. Critical Technologies**

As evidenced by agency rating of the importance of a wide variety of technologies and vendor ranking of the same technologies, federal agencies believe that they have specific needs and little interest in the application of wide-ranging technologies. As indicated in Exhibit VI-22, vendors believe that the most critical technology need is for local-area networks. Systems to manage these networks follow closely in the rankings.

Neither agencies nor vendors consider cellular telephones, ISDN, VSATs, or satellite networks to be of great importance. ISDN will grow in importance over the five year-period, but not to a great extent. Local-area networks are very clearly important and will become increasingly important over the next five years.

## **6. Standards**

Vendors and federal agencies agree that the federal government should migrate toward the use of OSI standards for telecommunications protocols. In support of this move, the National Institute of Standards and Technology (NIST) adopted a set of internationally recognized communications protocols as the Government Open Systems Interconnection Profile (GOSIP) standard.



## EXHIBIT VI-22

### Vendor Ranking of Criticality of Telecommunications Technologies

Technology	Rank*	
	Market Today	By 1995
LANs	1	1
Network Management Systems	2	1
Electronic Mail	3	4
EDI	4	3
VAN Services	5	7
Satellite Networks	6	8
VSAT Networks	7	6
ISDN	8	5
Cellular Telephones	9	9

\*Based on average ratings by respondents: 1 - 5 scale, where 5 = extremely critical, and 1 = not critical at all.

The NIST spent nearly two years developing GOSIP as a federal information processing standard (FIPS). According to the institute, the GOSIP profile will include the message-handling systems, as well as the file transfer, access, and management applications of the International Standard Organization's Open Systems Interconnection (OSI) standards. This set of protocols will operate in four network environments: X.25, Carrier Sense Multiple Access with Collision Detection (CSMA/CD; IEEE 802.3), Token Bus (IEEE 802.4), and Token Ring (IEEE 802.5).

Because of the support for GOSIP, the full OSI reference model and associated standards are expected to continue to gain vendor support during the next five years. Nearly all vendors providing telecommunications products and services to the federal government will expand their product support of OSI protocols, add OSI product support, or maintain the coverage they offer.

Even vendors with a strong commitment to proprietary protocols are responding to the federal trend toward OSI. IBM and Digital Equipment Corporation have both committed to support of OSI and are active participants in NIST-sponsored OSI activities.

In another telecommunications protocol development, the major standards organizations have been gradually moving toward agreement on architectures for network and LAN management. Groups within the IEEE 802 committee are developing protocols for LAN management that will fit into the layered OSI model. These protocols do not entirely agree with the same work done by the ISO, but industry representatives are working on convergence of these network protocols.

To ensure support for OSI and GOSIP, NIST is sponsoring demonstrations of OSI-based MAP/TOP systems. The institute is coordinating vendor activities on a project called OSINET, which provides vendors with a testbed X.25 network for developing, testing, and demonstrating OSI protocols and products. This network was provided by AT&T and Wang. As a result of their workshop and demonstrations, NIST issued the "Implementation Agreements for Open Systems Interconnection Protocols" (NISTIR-86-3385-4).

Communications protocol conformance has become an important marketing tool in developing products and services that reflect users' demand for products that implement common standards. Both industry and government see the need to continue to coordinate their efforts in protocol and standards development.

## D

---

### Vendor Concerns

In discussing the federal telecommunications market, vendors voiced several concerns about federal organization, staffing, and procurement practices.

#### 1. Federal Organization and Staffing

Vendors continue to express frustration with government progress toward integrated voice and data communications management. Although each agency's Office of Information Resources Management (OIRM) is chartered to manage both data and voice communications, necessary organizational changes have been made only recently.

Because of this confusion, vendors have had difficulty determining exactly which office or offices are responsible for telecommunications requirements and initiatives. In some cases, where agency voice and data communications are acquired and managed separately, vendors continually receive contradictory information about long-range telecommunications plans.

Vendors recognize that most agencies are still lagging industry in telecommunications expertise. Vendors also perceive that, as a result of this lag, many federal RFPs, live test demonstrations, and benchmarks contain terms, conditions, and specifications that are inappropriate for modern telecommunications systems. On the other hand, agencies with strong in-house telecommunications expertise tend to overspecify solutions and standards, rather than state requirements and let vendors bid appropriate technical solutions.

## **2. Vendor Improvements to Products and Services**

Vendors were asked what practices and services they believe vendors should change or improve over the next five years to make their products and services more valuable to the federal government. Replies varied, correlating to the different types and degrees of experience the vendors have encountered with federal agencies. Although the responses varied, there was a consistent theme.

As shown in Exhibit VI-23, vendors believe that there is a need for general technical and product education. Following this, other considerations are of considerably less importance. Agencies agree with the need to provide technical and general education. Ensuring that agency staff have up-to-date information about technology trends was the need most frequently mentioned by agency respondents.

## EXHIBIT VI-23

### Vendor Suggestions to Improve Responsiveness to Federal Telecommunications Needs

Suggestions	Percent of Responses*
Provide More General Technical and Product Education	40
Present Products Honestly	10
Provide Flexible Services	10
Develop More Specialized Products	10
Offer Creative Solutions	10
Fully Support Configurations	10
Network within the Government	10
Understand Regulations	10
Participate in Policy Making	10

\*Does not add to 100%; multiple responses allowed.

### 3. Factors Affecting Government Spending

Vendors surveyed by INPUT suggested several factors that could increase or decrease federal government spending on telecommunications products and services over the next two to five years. As shown in Exhibit VI-24, the most significant factor will be the availability of FTS 2000.

In INPUT's previous research, budget changes were considered the most significant factor. In this years research, budget problems (changes) were ranked closer to the bottom of the list. INPUT believes that the primary reason for the shift is the availability of FTS 2000.



## EXHIBIT VI-24

### Significant Factors That Will Affect Federal Use of Telecommunications Services through 1997

Factors	Rank*
FTS 2000	1
Increased Use of New Technology	2
Increased Use of PC-Based Distributed Processing	3
Budget Problems	3
Network Management	3

\*Based on frequency of mention by respondents.

Until FTS 2000 was available, agencies were required to place greater emphasis on the development of their own networking solutions. In addition, agencies were waiting to see what services would be included in FTS 2000 before moving ahead with their own plans. Since FTS 2000 will provide many services not previously available, many agencies will now proceed with plans to improve their telecommunications services.

#### 4. Agency-Required Actions

Selling to the federal government is a lengthy and difficult process. Vendors believe that the government should take a number of actions to improve its use of telecommunications services. As shown in Exhibit VI-25, shortening the procurement cycle is the most frequently mentioned action.

Following the change in procurement procedures, vendors believe that agencies would benefit from defining more umbrella contracts from which agencies could select solutions that would meet their need.

## EXHIBIT VI-25

### Government Actions to Use Telecommunications More Effectively

Actions	Rank*
Shorten Procurement Cycle	1
Integrate Requirements and Solutions in More Umbrella Contracts	1
Improve Technical Expertise	3
Improve Technical Communications with Vendors through RFIs and Draft RFPs	3
Share Technology and Technical Resources between Agencies	3

\*Rank based on frequency of mention.

## E

## INPUT Recommendations

Telecommunications vendors need to invest more time and effort in understanding agency missions and related communications requirements. Vendors need to be aware that in the federal contracting environment, there are many acquisitions that support multiple missions.

Further, there are other acquisitions supporting several parts of an agency with diverse functions. This type of acquisition covers numerous requirements under one contract, which ultimately limit the number of telecommunications opportunities in that agency. An understanding of unstated constraints and future federal directions is essential to a successful bidding strategy. Recommendations are summarized in Exhibit VI-26.

Vendors can assist agencies in preparation of better solicitations while improving their own strategic positions. To assist the federal government, vendors could offer briefings or seminars on key technical issues and regularly respond to agency Requests For Information (RFIs) and Statements of Work. Vendors might also send technical bulletins to agency management, technical, and contracting officials.

## EXHIBIT VI-26

**Recommendations to Vendors**

- Understand agency requirements
- Offer briefings/seminars
- Focus on long-term solutions
- Emphasize corporate stability
- Strengthen after-sale support
- Strengthen alliance positions
- Focus on interoperability
- Develop OSI/GOSIP models

Vendors should emphasize comprehensive, lasting solutions to agency telecommunications requirements. Single-vendor proposals for federal telecommunications programs must also address numerous agency concerns.

Among these agency concerns, vendors should include mention of long-term compatibility and expandability of the proposed system, and the potential for integration of voice/data communication. Vendors should emphasize corporate stability and a commitment to the telecommunications market. Finally, vendors should be aware of potential for additional revenues from continuation of services after award and implementation, particularly for communications hardware.

Vendors wishing to enter or expand their share of the federal telecommunications market face a number of significant barriers. Competition in the federal market requires considerable presolicitation investment. Also, many new federal telecommunications systems have been acquired within the last few years, with projected system life cycles of five to ten years. Further, development of attractive new telecommunications products and services is costly in terms of capital investment and qualified personnel.

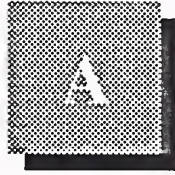
To overcome these barriers, and ultimately save valuable time and money, vendors should investigate alternative strategies for new-product development. Newer or smaller companies should develop teaming or subcontracting relationships with larger, more experienced federal telecommunications vendors, concentrating on vendors active in systems integration.

Vendors should also target new products and services for specific growth areas of interest of the federal government. These areas include interconnection and interoperability of existing hardware and teleconferencing facilities; and professional services, such as training and system design, management, and maintenance. Innovative products and services will be needed to realize a measurable federal market share.

Vendors should develop products and services around the OSI and GOSIP models to meet future federal requirements. Participation in NIST-sponsored OSI activities also presents a cost-effective approach to research and development.

Telecommunications hardware vendors must be watchful of current federal buying trends. They must be prepared to supplement their revenues beyond FY 1992 by providing additional enhancements and services for systems acquired in the late 1980s.





# Interview Profiles

## A

### Federal Agency Respondent Profile

---

#### 1. Contact Summary

For this study, INPUT interviewed 16 agency personnel by telephone:

- Policymakers - 11
- Program Managers - 5

#### 2. List of Agencies Interviewed

Department of Agriculture

National Aeronautics and Space Administration

Department of Commerce

Department of Defense  
Joint Staff

Department of Education

Export/Import Bank

Office of Human Services

Department of the Interior

Department of Justice

Federal Maritime Commission

General Accounting Office

Health and Human Services

Housing and Urban Development

Interstate Commerce Commission

National Oceanographic and Atmospheric Administration

U.S. Information Agency

## B

### Vendor Respondent Profile

For this study, INPUT contacted a representative sample of vendors who provide telecommunications systems or services to the federal government. Job classifications among individual vendor respondents included marketing as well as administrative executives. All contacts with vendor personnel were by telephone.

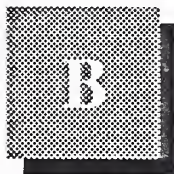
#### 1. Vendor Size and Revenue

- Average company revenue - \$1,440 million
- Average federal government revenue - \$214 million
- Average number of employees - 9,200

#### 2. Vendor Products and Services

Vendors indicated that they currently provide and plan on providing the following categories of products and services:

	Percent Providing	
	1990	1995
Hardware	85	85
Software	85	85
Professional Services	85	77
Local-Area Networks	77	69
Voice Services	69	69
Data Network Services	69	77



## Telecommunications Opportunities

This appendix lists specific opportunities and recent awards in the federal information technology market. Lists of programs are provided for future telecommunications and related services. The opportunities list consists of major programs that are typical of the federal market and serves as a representative sample. The recent awards section contains a list of programs previously tracked by INPUT that have been awarded.

### A

---

#### Present and Future Programs

Funding for telecommunications is provided in several budget categories of federal government agencies. New information technology programs, including telecommunications acquisitions that are larger than \$1 million - \$2 million, are listed in at least one of the following federal government documents:

- OMB/GSA/NIST Five-Year Plan, which is developed from agency budget requests submitted in compliance with OMB Circular A-11
- Agency long-range information resource plans developed to meet the reporting requirements of the Paperwork Reduction of 1980
- Agency annual operating budget requests submitted to both congressional oversight and appropriations committees based on the OMB A-11 information
- *Commerce Business Daily* notice of specific opportunities—for qualification as a bidder and for requesting a copy of an RFP or RFC
- Five-Year Defense Plan, which is not publicly available, and the supporting documentation of the separate military departments and agencies

Telecommunications opportunities may or may not be specifically identified as such in the following documents:

- Information technology planning documents usually identify mission requirements to be met by specific programs, rather than methods for meeting these requirements

To add to the difficulty of identifying planned telecommunications buys, most medium and smaller buys (valued at less than \$1 million) are rarely identified in agency budget documents.

All funding proposals are based on cost data of the year submitted, with inflation factors dictated by the Administration as part of its fiscal policy, and are subject to revision, reduction, or spread to future years in response to Congressional direction. Some additional reductions will be likely in fiscal 1991 and beyond due to the deficit reduction efforts.

## B

### Telecommunications Funding Requests

Although the following programs may require other products or services, they all include telecommunications support.

#### Telecommunications Funding Requests (From FY 1992, A-11, 43B Submissions)

Agency/Dept	Project	Funding (\$ Thousands)
Agriculture USDA/ASCS	Systems Technology and Telecommunications Enhancement Program. (STEP)	17,095
USDA/FCIC	FCIC Office Automation (FCIC-OA)	9,338
Air Force USAF/AFLC	Information Systems Engineering Prototype Development II (ISEPD II)	75,000-500,000
USAF/CSOC	Consolidated Space Operations Center Integration and Activation Support Contract (CIASC)	-
USAF/AFCC	Unified Local-Area Network Architecture (ULANA II)	158,000
USAF/HQSSD	Engineering Services and Modification Contract (ESMC)	28,000



Agency/Dept	Project	Funding (\$ Thousands)
Army		
USA/SIS	Sustaining Baseline Information Services (SBIS)	264,083
USA/COE	Military Construction Programming and Execution (PAX)	35,695
USA/CECOM	Common Hardware/Software II (CHS-II)	1,200,000 2,000,000
USA/USAISSA	ADP Systems Services and Installation of Applications System Software	19,498
USA/COE	ADP Services (TRACES)	-
USA	Small Multiuser Computer II (SMC II)	-
USA/ISSA	Defense Medical Systems Support Center Automation Support Hardware (DASH)	-
USA/USTRANSCOM	Global Transportation Network (GTN)	-
Commerce		
DOC/PTO	Automated Patent System (APS)	413,603
DOC/NIST	Computer-Aided Logistics Support (CALS)	-
Defense		
DoD/ASHA	Defense Enrollment Eligibility Reporting System (DEERS)	31,000
DoD	Computer-Aided Logistics Support (CALS)	1,000,000
DoD/DISA	National Emergency Telecommunications Service (NETS)	-
DoD/DECCO	Defense Information System Network (DISN)	1,000,000
DoD/DECA	Defense Commissary Information Program (DCIS)	50-100,000

Agency/Dept	Project	Funding (\$ Thousands)
DoD/DISA	SETA for U.S. Transportation Command	9,000
DoD/DISA	Worldwide Management Support Service for the Defense Switched Network	15,000
Education ED/OPE	General Electronic Support (GES)	6,001
Energy DOE	Power Control System	-
DOE/OROO	Waste Information Network (WIN)	-
DOE/WAPA	Private Branch Exchange System (PBX)	725
DOE/BPA	Computer Facilities and Telecommunications Services (COFATS)	
Executive Office of the President EOP/OA	Facilities Management Services	-
Federal Communications Commission FCC	Information Systems Modernization Project (ISM)	19,637
General Services Administration GSA	Government Procurement Automation Program	-
GSA/OTA	FEDSIM Multiple Award Indefinite Quantity Contracts Recompensation	10,000
GSA/IRMS	Telecommunications Support Contract (TSC)	54,000
Health and Human Services HHS/SSA	Turnkey Imaging Systems	-
HHS/HCFA	Telecommunications Service	-
HHS/NIH	IMPAC/CRISP Modernization	13,500
Interior DOI/BOM	Facilities Management Services	1,000

Agency/Dept	Project	Funding (\$ Thousands)
Justice DOJ/FBI	FBI Field Office Information Management System (FOIMS)	220,534
DOJ/FBI	Computer Application Communications Network (CACN)	105,367
DOJ/FBI	Integrated Automated Fingerprint Identification System (IAFIS)	755,772
DOJ/DEA	Office Automation	136,631
DOJ/INS	Personal Workstation Acquisition (PWAC)	25,810
DOJ/BOP	Local-Area Network Equipment and Software (BOP NET)	-
DOJ/ATR	ADP Facilities Management	13,567
National Aeronautics and NASA/MSFC	Space Administration Program Support Communications Network (PSCN)	200,000
NASA/ARC	Data Communications Support Services	45,000
NASA/GSFC	Mass Buy for Technical and Scientific Workstation (SEWP)	100,000
NASA/ARC	Testbed I Computer System (NHT-1)	20,000
NASA/JSC	Information System Contract (ISC)	164,438
NASA/HQ	NASA Headquarters Facilities Management Recompensation	60,000
NASA/JSC	Software Support Environment	9,000
Navy USN/NSSC	Navy CALS (CALS)	-
USN/SNWC	Navy Worldwide Military Command and Control System ADP Modernization (NAVY WAM)	56,176

Agency/Dept	Project	Funding (\$ Thousands)
USN/NSSC	Ship Service Telephone System (SSTS)	-
USN/ITAC	GOSIP Gateways	25,000
USN/ITAC	Omnibus Support Services	31,869
USN/NTSC	Defense Satellite Communications System (DSCS)	-
State DOS/ISO	DOS Mainframe (FEDCAC 101)	38,490
Tennessee Valley Authority TVA	TVA Workstation Pact	50,000
Transportation DOT/FAA	Telecommunications Satellite System (FAATSAT) via DISA	-
Treasury TREAS/IRS	Service Center Support System (SCSS)	1,058,332
TREAS/BPD	Series E/EE Savings Bond System (SEAS)	53,717
Veterans Affairs VA	Document Management System (DMS)	7,000

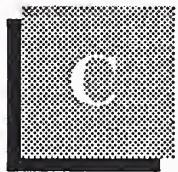


## C

## Recent Telecommunications Awards 1/89 - 2/92

Program	Acronym	Dept/Agency	Value
Air Force WWMCCS ADP Mode	(AFWAM)	USAF/ESD	1,875,000
Contracting Data Management	(COMS)	USAF	39,320
Standard Software Require	(SSRC 1)	USAF/SSC	1,500,000
Management Information System	(MISTS)	USAF/AFDW	180,000
Engineering Services	(ESMC)	USAF/HQSSD	28,298
Standard Depot Systems	(SDS)	USA/AMC	25,208
Small Multiuser Microcomputer	(SMC)	USA/SEC	700,000
Telecommunications Modernization	(TEMPO)	USA	600,000
Reserve Component Automation	(RCAS)	USA	1,600,000
Personal Electronic Reco	(PERMS /ODIS)	USA/ISSAA	51,000
Medical Diagnostic Imaging	(MDIS)	USA/CE	-
Defense Medical Systems		DEFENSE/OSD	67,000
Defense Data Network Installation	(DDN)	DoD/DCA	-
Joint Operations Planning	(JOPES)	DoD/DISA	25,873
ADP Support Services		ENERGY/OSTI	12,000
Telecommunications Improvement		HHS/PHS	100,000
Computerized Homes Underw	(CHUMS)	HHS/HUD	18,000
HUD Integrated Information	(HIIPS)	400,000	
Minicomputer System		DoJ/FPI	10,000
Minicomputer System		DoJ/BP	10,000

Program	Acronym	Dept/Agency	Value
ERISA Electronic Data Base		DoL/PWBA	2,600
Integrated Management Information	(IMIS)	DoL/OSHA	12,576
ADP System Support Service		NASA/LRC	6,000
Large-Scale Computer System		USN/NOARL	204,619
Standard Desktop Computer Companion		USN/NAVDAC	609,000
Navy PC LAN Contract	(AFCAC 299)	USN/NAS	54,000
Motorola Voice Privacy Te		TREASURY/USSS	2,017
Government On-Line Accounting	(GOALS)	TREASURY/FMS	16,000
Departmental Microcomputer	(DMAC II)	TREASURY	400,000
National Data Network		US COURTS	233,000
Integrated Data Communications	(IDCU)	VA/OIST	84,000
Nationwide Office Automation	(NOAVA)	VA	298,000



# Definition of Terms

## A

### Introduction

---

INPUT's *Definition of Terms* provides the framework for all of INPUT's market analyses and forecasts of the information services industry. It is used for all U.S. programs. The structure defined in Exhibit C-1 is also used in Europe and for the worldwide forecast.

One of the strengths of INPUT's market analysis services is the consistency of the underlying market sizing and forecast data. Each year INPUT reviews its industry structure and makes changes if they are required. When changes are made they are carefully documented and the new definitions and forecasts reconciled to the prior definitions and forecasts. INPUT clients have the benefit of being able to track market forecast data from year to year against a proven and consistent foundation of definitions.

For 1992 INPUT has incorporated customer services (hardware maintenance) into the information services industry structure. Equipment service becomes the ninth delivery mode used by INPUT to segment and analyze this industry.

In addition, some new areas are being researched during 1992 as part of the outsourcing area and may result in future changes to the industry structure. These areas of research are discussed in Section B 5 of this document.

**B****Overall Definitions and Analytical Framework****1. Information Services**

*Information Services* are computer/telecommunications-related products and services that are oriented toward the development or use of information systems. Information services typically involve one or more of the following:

- Processing of specific applications using vendor-provided systems (called *Processing Services*)
- A combination of hardware, packaged software and associated support services which will meet a specific application processing need (called *Turnkey Systems*)
- Packaged software products, either systems software or applications software products (called *Software Products*)
- People services that support users in developing and operating their own information systems (called *Professional Services*)
- Bundled combinations of products and services where the vendor assumes total responsibility for the development of a custom solution to an information systems problem (called *Systems Integration*)
- Services that provide operation and management of all or a significant part of a user's information systems functions under a long-term contract (called *Systems Operations*)
- Services associated with the delivery of information in electronic form—typically network-oriented services such as value-added networks, electronic mail and document interchange, on-line data bases, on-line news and data feeds, etc. (called *Network Services*)
- Services that support the operation of computer hardware and resident systems software (called *Equipment Services*)

In general, the market for information services does not involve providing equipment to users. The exception is where the equipment is bundled as part of an overall service offering such as a turnkey system, a systems operations contract, or a systems integration project.



The information services market also excludes pure data transport services (i.e., data or voice communications circuits). However, where information transport is associated with a network-based service (e.g., EDI or VAN services), or cannot be feasibly separated from other bundled services (e.g., some systems operations contracts), the transport costs are included as part of the services market.

The analytical framework of the information services industry consists of the following interacting factors: overall and industry-specific business environment (trends, events and issues); technology environment; user information system requirements; size and structure of information services markets; vendors and their products, services and revenues; distribution channels; and competitive issues.

## 2. Market Forecasts/User Expenditures

All information services market forecasts are estimates of *User Expenditures* for information services. When questions arise about the proper place to count these expenditures, INPUT addresses them from the user's viewpoint: expenditures are categorized according to what users perceive they are buying.

By focusing on user expenditures, INPUT avoids two problems which are related to the distribution channels for various categories of services:

- Double counting, which can occur by estimating total vendor revenues when there is significant reselling within the industry (e.g., software sales to turnkey vendors for repackaging and resale to end users)
- Missed counting, which can occur when sales to end users go through indirect channels such as mail order retailers

*Captive Information Services User Expenditures* are expenditures for products and services provided by a vendor that is part of the same parent corporation as the user. These expenditures are not included in INPUT forecasts.

*Non-captive Information Services User Expenditures* are expenditures that go to vendors that have a different parent corporation than the user. It is these expenditures which constitute the information services market analyzed by INPUT and that are included in INPUT forecasts.

## 3. Delivery Modes

*Delivery Modes* are defined as specific products and services that satisfy a given user need. While *Market Sectors* specify *who* the buyer is, *Delivery Modes* specify *what* the user is buying.

Of the nine delivery modes defined by INPUT, six are considered primary products or services:

- *Processing Services*
- *Network Services*
- *Professional Services*
- *Applications Software Products*
- *Systems Software Products*
- *Equipment Services*

The remaining three delivery modes represent combinations of these products and services, bundled together with equipment, management and/or other services:

- *Turnkey Systems*
- *Systems Operations*
- *Systems Integration*

Section C describes the delivery modes and their structure in more detail.

#### 4. Market Sectors

*Market Sectors* or markets are groupings or categories of the users who purchase information services. There are three types of user markets:

- *Vertical Industry* markets, such as Banking, Transportation, Utilities, etc. These are called “industry-specific” markets.
- *Functional Application* markets, such as Human Resources, Accounting, etc. These are called “cross-industry” markets.
- *Other* markets, which are neither industry- nor application-specific, such as the market for systems software products and much of the on-line data base market.

Specific market sectors used by INPUT are defined in Section E, below.

#### 5. Outsourcing

The changes in the information services area towards longer term client-vendor relationships has created a number of new types of *outsourcing* relationships. In addition to the nine delivery modes, INPUT will be conducting research during 1992 in each of the areas defined below. Based on this research, INPUT will review and may change its information services industry structure for 1992.

- **Outsourcing** - The contracting of all or a major part of an information systems process to an external vendor on a long-term basis. The vendor takes responsibility for the performance of the process.

- Outsourcing can include any or all of the following elements:
  - Processing Operations - The vendor is responsible for managing and operating the client's computer systems.
  - Network Operations - The vendor assumes full responsibility for the client's data communications systems. This may also include the voice communications of the client.
  - Applications Maintenance - The vendor has full responsibility for maintaining the applications software that the vendor uses as part of its business operations.
  - Applications Management - Not only does the vendor maintain and upgrade the applications software for the client, but also develops and implements new software as the need arises.
  - Desktop Services - The vendor assumes responsibility for the deployment, maintenance and connectivity between the PCs in the client organization. The service may also include performing the help desk function.

## C

### Delivery Modes and Submodes

Exhibit C-1 provides the overall structure of the information services industry as defined and used by INPUT. This section of *Definition of Terms* provides definitions for each of the delivery modes and their submodes or components.

#### 1. Software Products

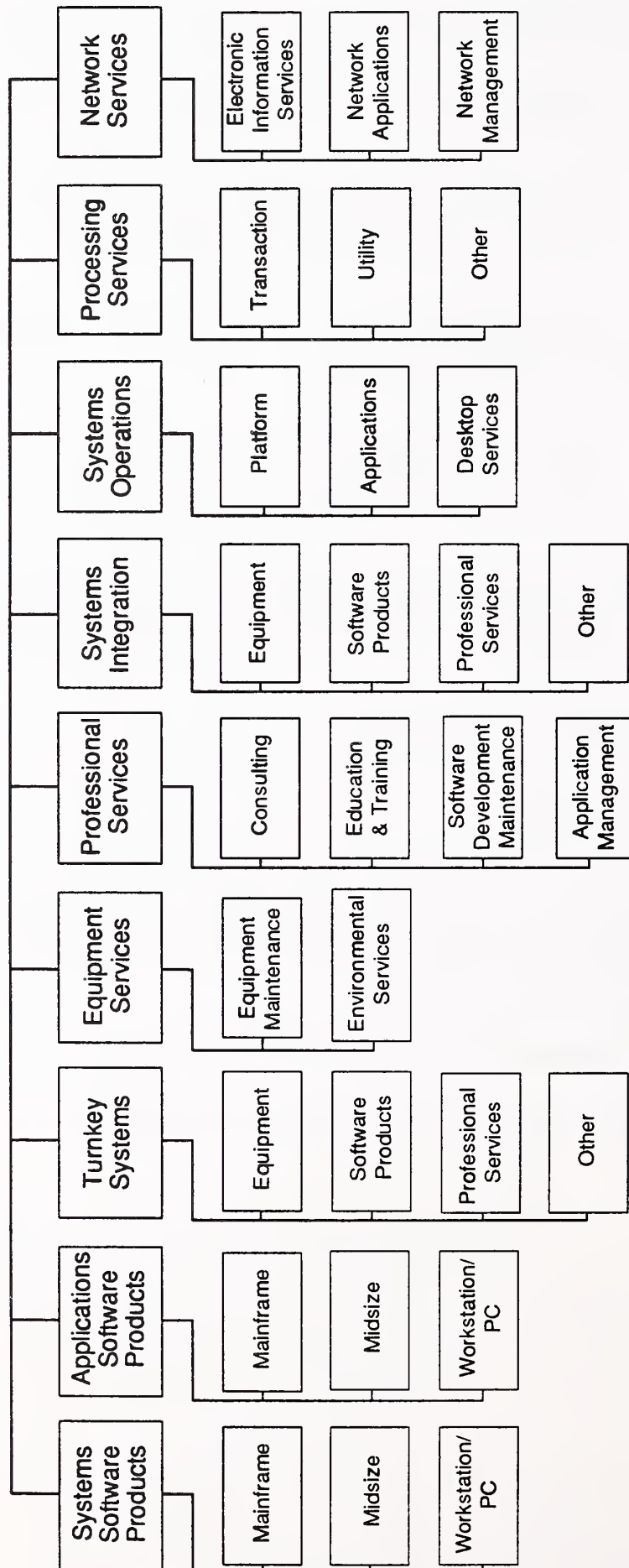
INPUT divides the software products market into two delivery modes: systems software and applications software.

The two delivery modes have many similarities. Both involve user purchases of software packages for in-house computer systems. Included are both lease and purchase expenditures, as well as expenditures for work performed by the vendor to implement or maintain the package at the user's sites. Vendor-provided training or support in operation and use of the package, if bundled in the software pricing, is also included here.

Expenditures for work performed by organizations other than the package vendor are counted in the professional services delivery mode. Fees for work related to education, consulting, and/or custom modification of software products are counted as professional services, provided such fees are charged separately from the price of the software product itself.

## EXHIBIT C-1

# Information Services Industry Structure



Source: INPUT



### a. Systems Software Products

Systems software products enable the computer/communications system to perform basic machine-oriented or user interface functions. INPUT divides systems software products into three submodes.

- *Systems Control Products* - Software programs that function during application program execution to manage computer system resources and control the execution of the application program. These products include operating systems, emulators, network control, library control, windowing, access control, and spoolers.
- *Operations Management Tools* - Software programs used by operations personnel to manage the computer system and/or network resources and personnel more effectively. Included are performance measurement, job accounting, computer operation scheduling, disk management utilities, and capacity management.
- *Applications Development Tools* - Software programs used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Included are traditional programming languages, 4GLs, data dictionaries, data base management systems, report writers, project control systems, CASE systems and other development productivity aids. Also included are system utilities (e.g., sorts) which are directly invoked by an applications program.

INPUT also forecasts the systems software products delivery mode by platform level: mainframe, minicomputer and workstation/PC.

### b. Applications Software Products

Applications software products enable a user or group of users to support an operational or administrative process within an organization. Examples include accounts payable, order entry, project management and office systems. INPUT categorizes applications software products into two submodes.

- *Industry-Specific Applications Software Products* - Software products that perform functions related to fulfilling business or organizational needs unique to a specific industry (vertical) market and sold to that market only. Examples include demand deposit accounting, MRPII, medical record keeping, automobile dealer parts inventory, etc.
- *Cross-Industry Applications Software Products* - Software products that perform a specific function that is applicable to a wide range of industry sectors. Examples include payroll and human resource systems, accounting systems, word processing and graphics systems, spreadsheets, etc.

INPUT also forecasts the applications software products delivery mode by platform level: mainframe, minicomputer and workstation/PC.

## 2. Turnkey Systems

A turnkey system is an integration of equipment (CPU, peripherals, etc.), systems software, and packaged or custom application software into a single product developed to meet a specific set of user requirements. Value added by the turnkey system vendor is primarily in the software and support services provided. Most CAD/CAM systems and many small business systems are turnkey systems. Turnkey systems utilize standard computers and do not include specialized hardware such as word processors, cash registers, process control systems, or embedded computer systems for military applications.

Computer manufacturers (e.g., IBM or DEC) that combine software with their own general-purpose hardware are not classified by INPUT as turnkey vendors. Their software revenues are included in the appropriate software category.

Most turnkey systems are sold through channels known as value-added resellers.

- *Value-Added Reseller (VAR)*: A VAR adds value to computer hardware and/or software and then resells it to an end user. The major value added is usually applications software for a vertical or cross-industry market, but also includes many of the other components of a turnkey systems solution, such as professional services.

Turnkey systems have three components:

- Equipment - computer hardware supplied as part of the turnkey system
- Software products - prepackaged systems and applications software products
- Professional services - services to install or customize the system or train the user, provided as part of the turnkey system sale

## 3. Processing Services

This delivery mode includes three submodes: transaction processing, utility processing, and "other" processing services.

- *Transaction Processing* - Client uses vendor-provided information systems—including hardware, software and/or data networks—at the vendor site or customer site to process transactions and update client data bases. Transactions may be entered in one of four modes:

- *Interactive* - Characterized by the interaction of the user with the system for data entry, transaction processing, problem solving and report preparation: the user is on-line to the programs/files stored on the vendor's system.
- *Remote Batch* - Where the user transmits batches of transaction data to the vendor's system, allowing the vendor to schedule job execution according to overall client priorities and resource requirements.
- *Distributed Services* - Where users maintain portions of an application data base and enter or process some transaction data at their own site, while also being connected through communications networks to the vendor's central systems for processing other parts of the application.
- *Carry-in Batch* - Where users physically deliver work to a processing services vendor.
- *Utility Processing* - Vendor provides basic software tools (language compilers, assemblers, DBMSs, graphics packages, mathematical models, scientific library routines, etc.), generic applications programs and/or data bases, enabling clients to develop their own programs or process data on the vendor's system.
- *Other Processing Services* - Vendor provides service—usually at the vendor site—such as scanning and other data entry services, laser printing, computer output microfilm (COM), CD preparation and other data output services, backup and disaster recovery, etc.

#### 4. Systems Operations

Systems operations was a new delivery mode introduced in the 1990 Market Analysis and Systems Operations programs. It was created by taking the Systems Operations submode out of both Processing Services and Professional Services. For 1992 the submodes have been defined as follows.

Systems operations involves the operation and management of all or a significant part of the user's information systems functions under a long-term contract. These services can be provided in either of two distinct submodes where the difference is whether the support of applications, as well as data center operations, is included.

- *Platform systems operations* - The vendor manages and operates the computer systems, often including telecommunications networks, without taking responsibility for the user's application systems.



- *Applications systems operations* - The vendor manages and operates the computer systems, often including telecommunications networks, and is also responsible for maintaining, or developing and maintaining, the user's application systems.

In the federal government market, systems operation services are also defined by equipment ownership with the terms "COCO" (Contractor-Owned, Contractor-Operated), and "GOCO" (Government-Owned, Contractor-Operated).

The ownership of the equipment, which was the previous basis for the systems operations submodes, is no longer considered critical to the commercial market. Most of the market consists of systems operations relationships using vendor-owned hardware. What is now critical is the breadth of the vendor/client relationship as it expands beyond data center management to applications management.

Systems operations vendors now provide a wide variety of services in support of existing information systems. The vendor can plan, control, provide, operate, maintain and manage any or all components of the user's information systems (equipment, networks, systems and/or applications software), either at the client's site or the vendor's site. Systems operations can also be referred to as "resource management" or "facilities management."

## 5. Systems Integration (SI)

Systems integration is a vendor service that provides a complete solution to an information system, networking or automation requirement through the custom selection and implementation of a variety of information system products and services. A systems integrator is responsible for the overall management of a systems integration contract and is the single point of contact and responsibility to the buyer for the delivery of the specified system function, on schedule and at the contracted price.

To be included in the information services market, systems integration projects must involve some application processing component. In addition, the majority of cost must be associated with information systems products and/or services.

- *Equipment* - Information processing and communications equipment required to build the systems solution. This component may include custom as well as off-the-shelf equipment to meet the unique needs of the project. The systems integration equipment category excludes turnkey systems by definition.
- *Software products* - Prepackaged applications and systems software products.



- *Professional services* - The value-added component that adapts the equipment and develops, assembles, or modifies the software and hardware to meet the system's requirements. It includes all of the professional services activities required to develop, and if included in the contract, operate an information system, including consulting, program/project management, design and integration, software development, education and training, documentation, and systems operations and maintenance.
- *Other services* - Most systems integration contracts include other services and product expenditures that are not easily classified elsewhere. This category includes miscellaneous items such as engineering services, automation equipment, computer supplies, business support services and supplies, and other items required for a smooth development effort.

Systems integrators perform, or manage others who perform, most or all of the following functions:

- Program management, including subcontractor management
- Needs analysis
- Specification development
- Conceptual and detailed systems design and architecture
- System component selection, modification, integration and customization
- Custom software design and development
- Custom hardware design and development
- Systems implementation, including testing, conversion and post-implementation evaluation and tuning
- Life cycle support, including
  - System documentation and user training
  - Systems operations during development
  - Systems maintenance

## 6. Professional Services

This category includes three submodes: consulting, education and training, and software development.

- *Consulting:* Services include management consulting (related to information systems), information systems consulting, feasibility analysis and cost-effectiveness studies, and project management assistance. Services may be related to any aspect of the information system, including equipment, software, networks and systems operations.
- *Education and Training:* Products and services related to information systems and services for the professional and end user, including computer-aided instruction, computer-based education, and vendor instruction of user personnel in operations, design, programming, and documentation.
- *Software Development:* Services include user requirements definition, systems design, contract programming, documentation, and implementation of software performed on a custom basis. Conversion and maintenance services are also included.

## 7. Network Services

Network services typically include a wide variety of network-based functions and operations. Their common thread is that most of these functions could not be performed without network involvement. Network services is divided into two submodes: *Electronic Information Services*, which involve selling information to the user, and *Network Applications*, which involve providing some form of enhanced transport service in support of a user's information processing needs.

### a. Electronic Information Services

Electronic information services are data bases that provide specific information via terminal- or computer-based inquiry, including items such as stock prices, legal precedents, economic indicators, periodical literature, medical diagnosis, airline schedules, automobile valuations, etc. The terminals used may be computers themselves, such as communications servers or personal computers. Users typically inquire into and extract information from the data bases. Although users may load extracted data into their own computer systems, the electronic information vendor provides no data processing or manipulation capability and the users cannot update the vendor's data bases.

The two kinds of electronic information services are:

- *On-line Data Bases* - Structured, primarily numerical data on economic and demographic trends, financial instruments, companies, products, materials, etc.
- *News Services* - Unstructured, primarily textual information on people, companies, events, etc.

While electronic information services have traditionally been delivered via networks, there is a growing trend toward the use of CD ROM optical disks to support or supplant on-line services, and these optical disk-based systems are included in the definition of this delivery mode.

#### **b. Network Applications**

*Value-Added Network Services (VAN Services)* - VAN services are enhanced transport services which involve adding such functions as automatic error detection and correction, protocol conversion, and store-and-forward message switching to the provision of basic network circuits.

While VAN services were originally provided only by specialized VAN carriers (Tymnet, Telenet, etc.), today these services are also offered by traditional common carriers (AT&T, Sprint, etc.). Meanwhile, the VAN carriers have also branched into the traditional common carriers' markets and are offering unenhanced basic network circuits as well.

INPUT's market definition covers VAN services only, but includes the VAN revenues of all types of carriers. The following are examples of VAN services.

- *Electronic Data Interchange (EDI)* - Application-to-application exchange of standardized business documents between trade partners or facilitators. This exchange is commonly performed using VAN services. Specialized translation software is typically employed to convert data from organizations' internal file formats to EDI interchange standards. This software may be provided as part of the VAN service or may be resident on the organization's own computers.
- *Electronic Information Exchange (EIE)* - Also known as electronic mail (E-mail), EIE involves the transmission of messages across an electronic network managed by a services vendor, including facsimile transmission (FAX), voice mail, voice messaging, and access to Telex, TWX, and other messaging services. This also includes bulletin board services.



- *Other Network Services* - This segment contains videotex and pure network management services. Videotex is actually more a delivery mode than an application. Its prime focus is on the individual as a consumer or in business. These services provide interactive access to data bases and offer the inquirer the ability to send as well as receive information for such purposes as home shopping, home banking, travel reservations, and more.

Network management services included here must involve the vendor's network and network management systems as well as people. People-only services are included in professional services that involve the management of networks as part of the broader task of managing a user's information processing functions are included in systems operations.

## 8. Equipment Services

The equipment services delivery mode includes two submodes. Each deals with the support and maintenance of computer equipment operations.

- *Equipment Maintenance* - Services provided to repair, diagnose problems and provide preventive maintenance both on-site and off-site. The costs of parts, media and other supplies are excluded. These services are typically provided on a contract basis.
- *Environmental Services* - Composed of equipment- and data center-related special services such as cabling, air conditioning and power supply, equipment relocation and similar services.

## D

### Hardware/Hardware Systems

*Hardware* - Includes all computer and telecommunications equipment that can be separately acquired with or without installation by the vendor and not acquired as part of an integrated system.

- *Peripherals* - Includes all input, output, communications, and storage devices (other than main memory) that can be connected locally to the main processor, and generally cannot be included in other categories such as terminals.
- *Input Devices* - Includes keyboards, numeric pads, card readers, light pens and track balls, tape readers, position and motion sensors, and analog-to-digital converters.
- *Output Devices* - Includes printers, CRTs, projection television screens, micrographics processors, digital graphics, and plotters



- *Communication Devices* - Includes modem, encryption equipment, special interfaces, and error control
- *Storage Devices* - Includes magnetic tape (reel, cartridge, and cassette), floppy and hard disks, solid state (integrated circuits), and bubble and optical memories

*Terminals* - Three types of terminals are described below:

- *User Programmable* - Also called intelligent terminals, including the following:
  - Single-station or standalone
  - Multistation, shared processor
  - Teleprinter
  - Remote batch
- *User Nonprogrammable*
  - Single-station
  - Multistation, shared processor
  - Teleprinter
- *Limited Function* - Originally developed for specific needs, such as point-of-sale (POS), inventory data collection, controlled access, and other applications

*Hardware Systems* - Includes all processors from microcomputers to supercomputers. Hardware systems may require type- or model-unique operating software to be functional, but this category excludes applications software and peripheral devices, other than main memory and processors or CPUs not provided as part of an integrated (turnkey) system.

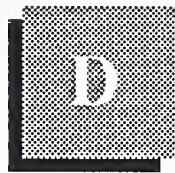
- *Microcomputer* - Combines all of the CPU, memory, and peripheral functions of an 8-, 16-, or 32-bit computer on a chip in various forms including:
  - Integrated circuit package
  - Plug-in boards with increased memory and peripheral circuits
  - Console including keyboard and interfacing connectors
  - Personal computer with at least one external storage device directly addressable by the CPU
  - An embedded computer which may take a number of shapes or configurations

- *Workstations* - High-performance, desktop, single-user computers employing (mostly) Reduced Instruction Set Computing (RISC). Workstations provide integrated, high-speed, local network-based services such as data base access, file storage and back-up, remote communications, and peripheral support. Typical workstation products are provided by Apollo (now a unit of Hewlett-Packard), Sun, Altos, DEC (the MicroVAX) and IBM. These products usually cost more than \$15,000. However, at this writing many companies have recently announced sizable price cuts.
- *Midsize Systems* - Describe superminicomputers and the more traditional business minicomputers. Due to steadily improving design and technology, the latter have outgrown traditional definitions (which defined small systems as providing 32-bit to 64-bit word lengths at prices ranging from \$15,000 to \$350,000). Increasingly, minicomputers and workstations meet the 32-bit definition, and may go beneath the \$15,000 lower price limit. Typical midrange systems include IBM System/3X, 43XX, AS/400, and 937X product lines, DEC PDP and VAX families (excluding MicroVAX families), and competitive products from a wide range of vendors, including HP, Data General, Wang, AT&T, Prime Concurrent, Gould, Unisys, NCR, Bull, Harris, Tandem, Stratus, and many others.
- *Large Computer* - Presently centered on storage controllers, but likely to become bus-oriented and to consist of multiple processors or parallel processor. Intended for structured mathematical and signal processing and typically used with general purpose, Von Neumann-type processors for system control. This term usually refers to traditional mainframes and supercomputers.
- *Supercomputer* - High-powered processors with numerical processing throughput that is significantly greater than the fastest general purpose computers, with capacities in the 100-500 million floating point operations per second (MFLOPS) range. Newer supercomputers, with burst modes over 500 MFLOPS, main storage size up to 10 million words, and on-line storage in the one-to-four gigabyte class, are labeled Class V to Class VII in agency long-range plans. Supercomputers fit in one of two categories:
  - Real Time - Generally used for signal processing in military applications
  - Non-Real Time - For scientific use in one of three configurations:
    - Parallel processors
    - Pipeline processor
    - Vector processor

- *Supercomputer* - Is also applied to micro, mini, and large mainframe computers with performance substantially higher than attainable by Von Neumann architectures.
- *Embedded Computer* - Dedicated computer system designed and implemented as an integral part of a weapon, weapon system, or platform; critical to a military or intelligence mission such as command and control, cryptological activities, or intelligence activities. Characterized by military specifications (MIL SPEC) appearance and operation, limited but reprogrammable applications software, and permanent or semipermanent interfaces. These systems may vary in capacity from microcomputers to parallel processor computer systems.







## Glossary of Federal Acronyms

The federal government's procurement language uses a combination of acronyms, phrases, and words that is complicated by different agency definitions and interpretations. The government also uses terms of accounting, business, economics, engineering, and law with new applications and technology.

Acronyms and contract terms that INPUT encountered most often in program documentation and interviews for this report are included here, but this glossary should not be considered all-inclusive. Federal procurement regulations (DAR, FPR, FAR, FIRMR, FPMR) and contract terms listed in RFIs, RFPs, and RFQs provide applicable terms and definitions.

Federal agency acronyms have been included to the extent they are employed in this report.

### A

#### Federal Acronyms

AAS	Automatic Addressing System.
AATMS	Advanced Air Traffic Management System.
ACS	Advanced Communications Satellite (formerly NASA 30/20 GHz Satellite Program).
ACT-1	Advanced Computer Techniques (Air Force).
Ada	DoD High-Order Language.
ADA	Airborne Data Acquisition.
ADL	Authorized Data List.
ADNET	Anti-Drug Network.
ADS	Automatic Digital Switches (DCS).
AFA	Air Force Association.
AFCEA	Armed Forces Communications Electronics Association.
AGE	Aerospace Ground Equipment.
AIP	Array Information Processing.

AIS	Automated Information System.
AMD	Acquisition Management Directorate.
AMPE	Automated Message Processing Equipment.
AMPS	Automated Message Processing System.
AMSL	Acquisition Management Systems List.
ANG	Army National Guard
AP(P)	Advance Procurement Plan.
Appropriation	Congressionally approved funding for authorized programs and activities of the Executive Branch.
APR	Agency Procurement Request.
ARC	Acquisition Review Council.
ARPANET	DARPA network of scientific computers.
ASP	Aggregated Switch Procurement
ATLAS	Abbreviated Test Language for All Systems (for ATE-Automated Test Equipment).
Authorization	In the legislative process programs, staffing, and other routine activities must be approved by Oversight Committees before the Appropriations Committee will approve the money from the budget.
AUSA	Association of the U.S. Army.
AUTODIN	AUTOMatic DIGital Network of the Defense Communications System.
AUTOSEVOCOM	AUTOMatic SEcure VOice COMmunications Network
AUTOVON	AUTOMatic VOice Network of the Defense Communications System.
BA	Basic Agreement.
BAFO	Best And Final Offer.
Base level	Procurement, purchasing, and contracting at the military installation level.
BCA	Board of Contract Appeals.
Benchmark	Method of evaluating ability of a candidate computer system to meet user requirements.
Bid protest	Objection (in writing, before or after contract award) to some aspect of a solicitation by a valid bidder.
BML	Bidders Mailing List—qualified vendor information filed annually with federal agencies to automatically receive RFPs and RFQs in areas of claimed competence.
BOA	Basic Ordering Agreement.
B&P	Bid and Proposal—vendor activities in response to government solicitation/specific overhead allowance.
BPA	Blanked Purchase Agreement.
Budget	Federal Budget, proposed by the President and subject to Congressional review.
C <sup>2</sup>	Command and Control.
C <sup>3</sup>	Command, Control, and Communications.
C <sup>4</sup>	Command, Control, Communications, and Computers.
C <sup>3</sup> I	Command, Control, Communications, and Intelligence.
CAB	Contract Adjustment Board or Contract Appeals Board.
CADE	Computer-Aided Design and Engineering.
CADS	Computer-Assisted Display Systems.
CAIS	Computer-Assisted Instruction System.

CALS	Computer-Aided Logistics Support.
CAPS	Command Automation Procurement Systems.
CAS	Contract Administration Services or Cost Accounting Standards.
CASB	Cost Accounting Standards Board.
CASP	Computer-Assisted Search Planning.
CBD	<i>Commerce Business Daily</i> —U.S. Department of Commerce publication listing government contract opportunities and awards.
CBO	Congressional Budget Office.
CCEP	Commercial Comsec Endorsement Program
CCDR	Contractor Cost Data Reporting.
CCN	Contract Change Notice.
CCPDS	Command Center Processing and Display Systems.
CCPO	Central Civilian Personnel Office.
CDR	Critical Design Review.
CDRL	Contractor Data Requirement List.
CFE	Contractor-Furnished Equipment.
CFR	Code of Federal Regulations.
CICA	Competition in Contracting Act
CIG	Computerized Interactive Graphics.
CIM	Corporate Information Management or Center for Information Management.
CINCs	Commanders-in-Chief.
CIR	Cost Information Reports.
CM	Configuration Management.
CMI	Computer-Managed Instruction.
CNI	Communications, Navigation, and Identification.
CO	Contracting Office, Contract Offices, or Change Order.
COC	Certificate of Competency (administered by the Small Business Administration).
COCO	Contractor-Owned, Contractor-Operated.
CODSIA	Council of Defense and Space Industry Associations.
COMSTAT	Communications Satellite Corporation.
CONUS	CONtinental United States.
COP	Capability Objective Package.
COTR	Contracting Officer's Technical Representative.
COTS	Commercial Off-the-Shelf (Commodities).
CP	Communications Processor.
CPAF	Cost-Plus-Award-Fee Contract.
CPFF	Cost-Plus-Fixed-Fee Contract.
CPIF	Cost-Plus-Incentive-Fee Contract.
CPR	Cost Performance Reports.
CPSR	Contractor Procurement System Review.
CR	Cost Reimbursement (Cost Plus Contract).
CSA	Combat or Computer Systems Architecture.
CSIF	Communications Services Industrial Fund.
C/SCSC	Cost/Schedule Control System Criteria (also called "C-Spec").
CWAS	Contractor Weighted Average Share in Cost Risk.



DAB	Defense Acquisition Board.
DABBS	Defense Acquisition Bulletin Board System.
DAL	Data Accession List.
DAR	Defense Acquisition Regulations.
DARPA	Defense Advanced Research Projects Agency.
DAS	Data Acquisition System.
DBHS	Data Base Handling System.
DBOF	Defense Business Operating Fund.
DCA	Defense Communications Agency (see DISA).
DCAA	Defense Contract Audit Agency.
DCAS	Defense Contract Administration Services.
DCASR	DCAS Region.
DCC	Digital Control Computer.
DCP	Development Concept Paper (DoD).
DCS	Defense Communications System.
DCTN	Defense Commercial Telecommunications Network.
DDA	Dynamic Demand Assessment (Delta Modulation).
DDC	Defense Documentation Center.
DDI	Director of Defense Information.
DDL	Digital Data Link—A segment of a communications network used for data transmission in digital form.
DDN	Defense Data Network.
DDS	Defense Distribution System.
DECCO	DEfense Commercial Communications Office.
DECEO	DEfense Communications Engineering Office.
D&F	Determination and Findings—required documentation for approval of a negotiated procurement.
DFAS	Defense Finance and Accounting Service.
DIA	Defense Intelligence Agency.
DIF	Document Interchange Format, Navy-sponsored word processing standard.
DISA	Defense Information Systems Agency (Formerly DCA).
DHHS	Department of Health and Human Services.
DIDS	Defense Integrated Data Systems.
DISC	Defense Industrial Supply Center.
DLA	Defense Logistics Agency.
DMA	Defense Mapping Agency.
DMR	Defense Management Review.
DMRD	Defense Management Review Decision.
DNA	Defense Nuclear Agency.
DO	Delivery Order.
DOA	Department of Agriculture (also USDA).
DOC	Department of Commerce.
DOE	Department of Energy.
DOI	Department of Interior.
DOJ	Department of Justice.
DOS	Department of State.
DOT	Department of Transportation.
DPA	Delegation of Procurement Authority (granted by GSA under FPRs).



DPC	Defense Procurement Circular.
DQ	Definite Quantity Contract.
DQ/PL	Definite Quantity Price List Contract.
DR	Deficiency Report.
DRFP	Draft Request For Proposal.
DSCS	Defense Satellite Communication System.
DSN	Defense Switched Network.
DSP	Defense Support Program (WWMCCS).
DSS	Defense Supply Service.
DTC	Design-To-Cost.
DTN	Defense Transmission Network.
ECP	Engineering Change Proposal.
ED	Department of Education.
EEO	Equal Employment Opportunity.
8(a) Set-Aside	Agency awards direct to Small Business Administration for direct placement with a socially/economically disadvantaged company.
EMC	Electro-Magnetic Compatibility.
EMCS	Energy Monitoring and Control System.
EO	Executive Order—Order issued by the President.
EOQ	Economic Ordering Quantity.
EPA	Economic Price Adjustment.
EPA	Environmental Protection Agency.
EPMR	Estimated Peak Monthly Requirement.
EPS	Emergency Procurement Service (GSA) or Emergency Power System.
EUC	End User Computing, especially in DoD.
FA	Formal Advertising.
FAC	Facility Contract.
FAR	Federal Acquisition Regulations.
FCA	Functional Configuration Audit.
FCC	Federal Communications Commission.
FCDC	Federal Contract Data Center.
FCRC	Federal Contract Research Center.
FDPC	Federal Data Processing Center.
FEDSIM	Federal (Computer) Simulation Center (GSA).
FEMA	Federal Emergency Management Agency.
FFP	Firm Fixed-Price Contract (also Lump Sum Contract).
FIPR	Federal Information Processing Resource.
FIPS	NBS Federal Information Processing Standard.
FIPS PUBS	FIPS Publications.
FIRMR	Federal Information Resource Management Regulations.
FMS	Foreign Military Sales.
FOC	Final Operating Capability.
FOIA	Freedom of Information Act.
FP	Fixed-Price Contract.
FP-L/H	Fixed-Price—Labor/Hour Contract.
FP-LOE	Fixed-Price—Level-Of-Effort Contract.

FPMR	Federal Property Management Regulations.
FPR	Federal Procurement Regulations.
FSC	Federal Supply Classification.
FSG	Federal Supply Group.
FSN	Federal Supply Number.
FSS	Federal Supply Schedule or Federal Supply Service (GSA).
FSTS	Federal Secure Telecommunications System.
FT Fund	A revolving fund, designated as the Federal Telecommunications Fund, used by GSA to pay for GSA-provided common-user services, specifically including the current FTS and proposed FTS 2000 services.
FTSP	Federal Telecommunications Standards Program administered by NCS; Standards are published by GSA.
FTS	Federal Telecommunications System.
FTS 2000	Replacement of the Federal Telecommunications System.
FY	Fiscal Year.
FYDP	Five-Year Defense Plan.
GAO	General Accounting Office.
GFE	Government-Furnished Equipment.
GFM	Government-Furnished Material.
GFY	Government Fiscal Year (October to September).
GIDEP	Government-Industry Data Exchange Program.
GOCO	Government Owned—Contractor Operated.
GOGO	Government Owned—Government Operated.
GOSIP	Government Open Systems Interconnection Profile.
GPO	Government Printing Office.
GPS	Global Positioning System.
GRH	Gramm-Rudman-Hollings Act (1985), also called Gramm-Rudman Deficit Control.
GS	General Schedule.
GSA	General Services Administration.
GSBCA	General Services Administration Board of Contract Appeals.
HCFA	Health Care Financing Administration.
HHS	(Department of) Health and Human Services.
HPA	Head of Procuring Activity.
HSDP	High-Speed Data Processors.
HUD	(Department of) Housing and Urban Development.
I-CASE	Integrated Computer-Aided Software Engineering.
IAR	Senior IRM Official.
ICA	Independent Cost Analysis.
ICAM	Integrated Computer-Aided Manufacturing.
ICE	Independent Cost Estimate.
ICP	Inventory Control Point.
ICST	Institute for Computer Sciences and Technology, National Bureau of Standards, Department of Commerce.
IDAMS	Image Display And Manipulation System.

IDEP	Interservice Data Exchange Program.
IDIQ	Indefinite Delivery-Indefinite Quantity.
IDN	Integrated Data Network.
IFB	Invitation For Bids.
IOC	Initial Operating Capability.
IOI	Internal Operating Instructions.
IPS	Integrated Procurement System.
IQ	Indefinite Quantity Contract.
IR&D	Independent Research & Development.
IRM	Information Resources Management.
IXS	Information Exchange System.
JCS	Joint Chiefs of Staff.
JCALS	Joint Computer-Aided Logistics Support.
JFMIP	Joint Financial Management Improvement Program.
JOCIT	Jovial Compiler Implementation Tool.
JSIPS	Joint Systems Integration Planning Staff.
JSOP	Joint Strategic Objectives Plan.
JSOR	Joint Service Operational Requirement.
JUMPS	Joint Uniform Military Pay System.
JWAM	Joint WWMCCS ADP Modernization (Program).
LC	Letter Contract.
LCC	Life Cycle Costing.
LCMP	Life Cycle Management Procedures (DD7920.1).
LCMS	Life Cycle Management System.
L-H	Labor-Hour Contract.
LOI	Letter of Interest.
LRPE	Long-Range Procurement Estimate.
LRIRP	Long-Range Information Resource Plan.
LTD	Live Test Demonstration.
MAISRC	Major Automated Information Systems Review Council (DoD).
MANTECH	MANufacturing TECHnology.
MAPS	Multiple Address Processing System.
MAP/TOP	Manufacturing Automation Protocol/Technical and Office Protocol.
MASC	Multiple Award Schedule Contract.
MDA	Multiplexed Data Accumulator.
MENS	Mission Element Need Statement or Mission Essential Need Statement (see DD-5000.1 Major Systems Acquisition).
MILSCAP	Military Standard Contract Administration Procedures.
MIL SPEC	Military Specification.
MIL STD	Military Standard.
MIPR	Military Interdepartmental Purchase Request.
MLS	Multilevel Security.
MNF	Multi-National Force.
MOD	Modification.
MOL	Maximum Ordering Limit (Federal Supply Service).



MPC	Military Procurement Code.
MYP	Multi-Year Procurement.
NARDIC	Navy Research and Development Information Center.
NASA	National Aeronautics and Space Administration.
NBS	National Bureau of Standards.
NCA	National Command Authorities.
NCMA	National Contract Management Association.
NCS	National Communications System (evolving to DISN).
NICRAD	Navy-Industry Cooperative Research and Development.
NIP	Notice of Intent to Purchase.
NIST	National Institute for Standards and Technology (Nee: NBS)
NMCS	National Military Command System.
NSA	National Security Agency.
NSEP	National Security and Emergency Preparedness.
NSF	National Science Foundation.
NSIA	National Security Industrial Association.
NTIA	National Telecommunications and Information Administration of the Department of Commerce; (replaced the Office of Telecommunications Policy in 1970).
NTIS	National Technical Information Service.
Obligation	"Earmarking" of specific funding for a contract from committed agency funds.
OCS	Office of Contract Settlement.
OFCC	Office of Federal Contract Compliance.
Off-Site	Services to be provided near but not in government facilities.
OFMP	Office of Federal Management Policy (GSA).
OFPP	Office of Federal Procurement Policy.
OIRM	Office of Information Resources Management.
O&M	Operations & Maintenance.
OMB	Office of Management and Budget.
O,M&R	Operations, Maintenance, and Readiness.
On-Site	Services to be performed on a government installation or in a specified building.
OPM	Office of Procurement Management (GSA) or Office of Personnel Management.
Options	Sole-source additions to the base contract for services or goods to be exercised at the government's discretion.
OSADBU	Office of Small and Disadvantaged Businesses.
OSHA	Occupational Safety and Health Act.
OSI	Open System Interconnect.
OSP	Offshore Procurement.
OTA	Office of Technology Assessment (Congress).
Out-Year	Proposed funding for fiscal years beyond the Budget Year (next fiscal year).
P-1	FY Defense Production Budget.
P3I	Pre-Planned Product Improvement (program in DoD).
PAR	Procurement Authorization Request or Procurement Action Report.
PAS	Pre-Award Survey.
PASS	Procurement Automated Source System.
PCO	Procurement Contracting Officer.
PDA	Principal Development Agency.



PDM	Program Decision Memorandum.
PDR	Preliminary Design Review.
PIR	Procurement Information Reporting.
PME	Performance Monitoring Equipment.
PMP	Purchase Management Plan.
PO	Purchase Order or Program Office.
POE	Panel Of Experts.
POM	Program Objective Memorandum.
POSIX	Portable Open System Interconnection Exchange.
POTS	Purchase of Telephone Systems.
PPBS	Planning, Programming, Budgeting System.
PR	Purchase Request or Procurement Requisition.
PRA	Paperwork Reduction Act.
PS	Performance Specification—alternative to a Statement of Work, when work to be performed can be clearly specified.
QA	Quality Assurance.
QAO	Quality Assurance Office.
QMCS	Quality Monitoring and Control System (DoD software).
QMR	Qualitative Material Requirement (Army).
QPL	Qualified Products List.
QRC	Quick Reaction Capability.
QRI	Quick Reaction Inquiry.
R-1	FY Defense RDT&E Budget.
RAM	Reliability, Availability, and Maintainability.
RC	Requirements Contract.
R&D	Research and Development.
RDA	Research, Development, and Acquisition.
RDD	Required Delivery Date.
RD&E	Research, Development, and Engineering.
RDF	Rapid Deployment Force.
RDT&E	Research, Development, Test, and Engineering.
RFI	Request For Information.
RFP	Request For Proposal.
RFQ	Request For Quotation.
RFTP	Request For Technical Proposals (Two-Step).
ROC	Required Operational Capability.
ROI	Return On Investment.
RTAS	Real Time Analysis System.
RTDS	Real Time Display System.
SA	Supplemental Agreement.
SADBU	Small and Disadvantaged Business Utilization.
SBA	Small Business Administration.
SB Set-Aside	Small Business Set-Aside contract opportunities with bidders limited to certified small businesses.
SCA	Service Contract Act (1964 as amended).

SCN	Specification Change Notice.
SDN	Secure Data Network.
SEC	Securities and Exchange Commission.
SE&I	Systems Engineering and Integration.
SETA	Systems Engineering/Technical Assistance.
SETS	Systems Engineering/Technical Support.
SIBAC	Simplified Intragovernmental Billing and Collection System.
SIMP	Systems Integration Master Plan.
SIOP	Single Integrated Operations Plan.
Sole Source	Contract award without competition.
Solicitation	Invitation to submit a bid.
SOR	Specific Operational Requirement.
SOW	Statement of Work.
SSA	Source Selection Authority (DoD).
SSAC	Source Selection Advisory Council.
SSEB	Source Selection Evaluation Board.
SSO	Source Selection Official (NASA).
STINFO	Scientific and Technical INFOrmation Program—Air Force/NASA.
STU	Secure Telephone Unit.
SWO	Stop-Work Order.
Synopsis	Brief Description of contract opportunity in CBD after D&F and before release of solicitation.
TA/AS	Technical Assistance/Analysis Services.
TCP/IP	Transmission Control Protocol/Internet Protocol.
TEMPEST	Studies, inspections, and tests of unintentional electromagnetic radiation from computer, communication, command, and control equipment that may cause unauthorized disclosure of information; usually applied to DoD and security agency testing programs.
TILO	Technical and Industrial Liason Office—Qualified Requirement Information Program—Army.
TM	Time and Materials contract.
TOA	Total Obligational Authority (Defense).
TOD	Technical Objective Document.
TQM	Total Quality Management.
TR	Temporary Regulation (added to FPR, FAR).
TRACE	Total Risk Assessing Cost Estimate.
TRCO	Technical Representative of the Contracting Offices.
TREAS	Department of Treasury.
TRP	Technical Resources Plan.
TSP	GSA's Teleprocessing Services Program.
TVA	Tennessee Valley Authority.
UCAS	Uniform Cost Accounting System.
USA	U.S. Army.
USAF	U.S. Air Force.
USCG	U.S. Coast Guard.
USMC	U.S. Marine Corps.

USN	U.S. Navy.
U.S.C.	United States Code.
USPS	United States Postal Service.
USRRB	United States Railroad Retirement Board.
VA	Veterans Affairs Department.
VE	Value Engineering.
VHSIC	Very High Speed Integrated Circuits.
VIABLE	Vertical Installation Automation BaseLine (Army).
VICI	Voice Input Code Identifier.
VTC	Video Teleconferencing.
WAM	WWMCCS ADP Modernization Program.
WBS	Work Breakdown Structure.
WGM	Weighted Guidelines Method.
WIN	WWMCCS Intercomputer Network.
WITS	Washington Interagency Telecommunications System.
WIS	WWMCCS Information Systems.
WS	Work Statement—Offerer's description of the work to be done (proposal or contract).
WWMCCS	World-Wide Military Command and Control System.

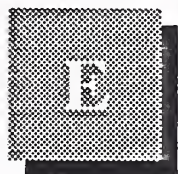
## B

### General and Industry Acronyms

ADAPSO	Association of Data Processing Service Organization, now the Computer Software and Services Industry Association. (See ITAA).
ADP	Automatic Data Processing.
ADPE	Automatic Data Processing Equipment.
ANSI	American National Standards Institute.
BOC	Bell Operating Company.
CAD	Computer-Aided Design.
CAM	Computer-Aided Manufacturing.
CASE	Computer-Aided Software Engineering.
CBEMA	Computer and Business Equipment Manufacturers Association.
CCIA	Computers and Communications Industry Association.
CCITT	Comite Consultatif Internationale de Télégraphique et Téléphonique; Committee of the International Telecommunication Union.
COBOL	COmmon Business-Oriented Language.
COS	Corporation for Open Systems.
CPU	Central Processor Unit.
DMBS	Data Base Management System.
DRAM	Dynamic Random Access Memory.

EIA	Electronic Industries Association.
EPROM	Erasable Programmable Read-Only Memory.
IEEE	Institute of Electrical and Electronics Engineers.
ISDN	Integrated Services Digital Networks.
ISO	International Organization for Standardization; voluntary international standards organization and member of CCITT.
ITAA	Information Technology Association of America (Formerly ADAPSO).
ITU	International Telecommunication Union.
LSI	Large-Scale Integration.
MFJ	Modified Final Judgement.
PROM	Programmable Read-Only Memory.
RBOC	Regional Bell Operating Company.
UNIX	AT&T Proprietary Operating System.
UPS	Uninterruptable Power Source.
VAR	Value-Added Reseller.
VLSI	Very Large-Scale Integration.
WORM	Write-Once-Read-Many-Times.





## Policies, Regulations, and Standards

### A

#### OMB Circulars

A-11	Preparation and Submission of Budget Estimates.
A-49	Use of Management and Operating Contracts.
A-71	Responsibilities for the Administration and Management of Automatic Data Processing Activities.
A-109	Major Systems Acquisitions.
A-120	Guidelines for the Use of Consulting Services.
A-121	Cost Accounting, Cost Recovery, and Integrated Sharing of Data Processing Facilities.
A-123	Internal Control Systems.
A-127	Financial Management Systems.
A-130	Management of Federal Information Resources.
A-131	Value Engineering.

### B

#### GSA Publications

The FIRMR as published by GSA is the primary regulation for use by federal agencies in the management, acquisition, and use of both ADP and telecommunications information resources.

### C

#### DoD Directives

DD-5000.1	Major System Acquisitions.
DD-5000.2	Major System Acquisition Process.
DD-5000.11	DoD Data Administration (C3I).
DD-5000.31	Interim List of DoD-Approved, High-Order Languages.
DD-5000.35	Defense Acquisition Regulatory Systems.
DD-5200.1	DoD Information Security Program.

DD-5200.28	Security Requirements for Automatic Data Processing (ADP) Systems.
DD-5200.28-M	Manual of Techniques and Procedures for Implementing, Deactivating, Testing, and Evaluating Secure Resource Sharing ADP Systems.
DD-7920.2	Major Automated Information Systems Approval Process.
DD-7935	Automated Data Systems (ADS) Documentation.
DoDD 3405.1	Computer Programming Language Policy
DoDD 5000.11	DoD Data administration (C31)
DoDI 5000.12	Data Elements and Data Codes Standardization Procedure
DoDI 5000.18	Implementation of Standard Data Elements and Related Features
DoDD 5105.19	Defense Information Systems Agency
DoDD 5110.4	Washington Headquarters Services
DoDD 5118.3	Comptroller of the Department of Defense
DoDD 5137.1	Assistant Secretary of Defense (Command, Control, Communications, and Intelligence)
DoDD 7740.1	DoD Information Resources Management Program
DoD 7740.1-G	DoD ADP Internal Control Guideline
DoDD 7740.2	Automated Information System (AIS) Strategic Planning
DoDI 7740.3	Information Resources Management (IRM) Review Program
DoDD 7750.5	Management and Control of Information Requirements
DoDI 7750.7	DoD Forms Management Program
DoDI 7920.2-M	Automated Information Systems (AIS) Life-Cycle Manual
DoDI 7920.4	Baselining of Automated Information Systems (AISs)
DoDI 7920.5	Management of End User Computing (EUC)
DoDI 7930.1	Information Technology Users Group Program
DoDI 7930.2	ADP Software Exchange and Release
DoDD 7950.1	Automated Data Processing Resources Management
DoD 7950.1-M	Defense Automated Resources Management Manual of Information Requirements

## D

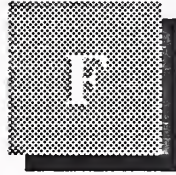
### Standards

ADCCP	Advanced Data Communications Control Procedures; ANSI Standard X3.66 of 1979; also NIST FIPS 71.
CCITT G.711	International PCM standard.
CCITT T.0	International standard for classification of facsimile apparatus for document transmission over telephone-type circuits.

DEA-1	Proposed ISO standard for data encryption based on the NIST DES.
EIA RS-170	Monochrome video standard.
EIA RS-170A	Color video standard.
EIA RS-464	EIA PBX standards.
EIA RS-465	Standard for Group III facsimile.
EIA RS-466	Facsimile standard; procedures for document transmission in the General Switched Telephone Network.
EIA RS-232-C	EIA DCE to DTE interface standard using a 25-Pin connector; similar to CCITT V-24.
EIA RS-449	New EIA standard DTE to DCE interface which replaces RS-232-C.
FED-STD 1000	Proposed Federal Standard for adoption of the full OSI reference model.
FED-STD 1026	Federal Data Encryption Standard (DES) adopted in 1983; also FIPS 46.
FED-STD 1041	Equivalent to FIPS 100.
FED-STD 1061	Group II Facsimile Standard (1981).
FED-STD 1062	Federal standard for Group III facsimile; equivalent to EIA RS-465.
FED-STD 1063	Federal facsimile standard; equivalent to EIA RS-466.
FED-STDs 1005, 1005A-1008	Federal Standards for DCE Coding and Modulation.
FIPS 46	NIST Data Encryption Standard (DES).
FIPS 81	DES Modes of Operation.
FIPS 100	NIST Standard for packet-switched networks; subset of 1980 CCITT X.25.
FIPS 107	NIST Standard for local-area networks, similar to IEEE 802.2 and 802.3.
FIPS 146	Government Open Systems Interconnection (OSI) Profile (GOSIP).
FIPS 151	NIST POSIX (Portable Operating System Interface for UNIX) standard.
IEEE 802.2	OSI-Compatible IEEE standard for data-link control in local-area networks.
IEEE 802.3	Local-area network standard similar to Ethernet.
IEEE 802.4	OSI-compatible standard for token bus local-area networks.
IEEE 802.5	Local-area networks standard for token ring networks.
IEEE P1003.1	POSIX standard, similar to FIPS 151.

MIL-STD-188-114C	Physical interface protocol similar to RS-232 and RS-449.
MIL-STD-1777	IP-Internet Protocol.
MIL-STD-1778	TCP - Transmission Control Protocol.
MIL-STD-1780	File Transfer Protocol.
MIL-STD-1781	Simple Mail Transfer Protocol (electronic mail).
MIL-STD-1782	TELNET - virtual terminal protocol.
MIL-STD-1815A	Ada Programming Language Standard.
SVID	UNIX System Interface Definition.
X.12	ANSI standard for Electronic Data Interchange
X.21	CCITT standard for interface between DTE and DCE for synchronous operation on public data networks.
X.25	CCITT standard for interface between DTE and DCE for terminals operating in the packet mode on public data networks.
X.75	CCITT standard for links that interface different packet networks.
X.400	ISO application-level standard for the electronic transfer of messages (electronic mail).





## Related INPUT Reports

*U. S. Information Services Overview, 1991*

*U.S. Information Services Industry Markets, 1991*

*U.S. Information Services Cross-Industry Markets, 1991*

*Procurement Analysis Reports, GFY 1992-1997*

*U.S. Information Services Industry, 1991*

*Federal Large-Scale Systems Market, 1988-1993*

*Federal Professional Services Market, 1990-1995*

*Federal Software and Related Services Market, 1989-1994*

*Federal Midsize Systems Market, 1988-1993*

*Federal Geographic Information Systems Market, 1991-1996*

*Federal Systems Integration Market, 1991-1996*

*Federal Telecommunications Market, 1990-1995*

*Federal Electronic Imaging Market, 1991-1996*

*Federal Office Information Systems Market, 1988-1993*

*Federal Network Management Market, 1991-1996*

*Federal Microcomputer Market, 1989-1994*

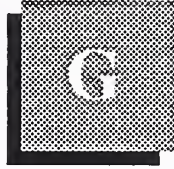
*Federal Computer Equipment Market, 1991-1996*

*Defense Logistics Agency Information Services Market, 1991*

*NASA Information Systems Market, 1991-1996*

*U. S. Electronic Commerce/EDI Federal Markets, 1992-1997*





# Questionnaires

## Federal Agency Questionnaire Federal Telecommunications Market 1990-1995

First, we would like your help to understand your planned expenditures for telecommunications. We would like to read a list of your agency's budget submissions and then ask two or three questions about the projects.

1. Based on our review of your agency's budget submissions, the following major programs are proposed for adding to or improving your agency's telecommunications services over the next five years. **Interviewer - Read the following list.**

Program	Annual Expense
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

2. Is this list current and complete?

\_\_\_\_\_ Yes (**Go to 4**)  
 \_\_\_\_\_ No

3. What programs should be added or removed? (**Interviewer Note - Add or delete programs from the list above**)

4. Of your agency's total telecommunications expense, please estimate the percentage that is allocated for each of the following five categories in FY 90? (Totals should equal 100%)

**Percent**

\_\_\_\_\_ Voice  
 \_\_\_\_\_ Leased Circuit  
 \_\_\_\_\_ Value-Added Networks  
 \_\_\_\_\_ Hardware (Purchase and Lease)  
 \_\_\_\_\_ Software  
 \_\_\_\_\_ Professional Services (consulting, programming, etc.)

5. For each of these five categories, please indicate whether you expect the amount spent to increase, decrease, or remain the same over the next five years.

	<b>Increase</b>	<b>Decrease</b>	<b>Same</b>
Voice	_____	_____	_____
Leased Circuits	_____	_____	_____
Value-Added Networks	_____	_____	_____
Hardware	_____	_____	_____
Software	_____	_____	_____

**Interviewer Note - For each category for which a decrease is noted, please ask why.**

---



---



---



---



---

6. What percentage of your agency's data network requirements are currently being met by the following types of networks?

**Percent**

\_\_\_\_\_ FTS  
 \_\_\_\_\_ FTS 2000  
 \_\_\_\_\_ Autovon  
 \_\_\_\_\_ Autodin  
 \_\_\_\_\_ DDN  
 \_\_\_\_\_ Agency Specific  
 \_\_\_\_\_ Other (Specify): \_\_\_\_\_



7. What percentage of your agency's data network requirements will be met by the following types of networks in 1995?

**Percent**

FTS  
 FTS 2000  
 Autovon  
 Autodin  
 DDN  
 Agency Specific  
 Other (Specify): \_\_\_\_\_

8. From your understanding of the services and capabilities provided as part of FTS 2000, please rate on a scale of 1-5 (1 being low) how well the FTS 2000 network will be able to meet your agency's data network needs over the next five years.

\_\_\_\_\_ Rating (Interviewer Note - If 3 or lower, ask why not higher?)

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

9. Now considering your data networks, what percent is managed by in-house staff and what percentage is managed by a contractor? (For the purpose of this question, contractor can mean either another government agency or an independent contractor.)

% In-House  
 % Contractor (Note - If 100% contractor, go to 13)

10. Considering the portion of your networks that are managed by in-house staff, is the management process centralized or decentralized?

Centralized  
 Decentralized  
 Both (Explain \_\_\_\_\_)

11. Do you plan to implement centralized network management centers for your data networks over the next five years? Why or why not?

Yes  
 No

Why? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

12. Have you considered contracting for the management of your data networks with a third party? Why or why not?
- ☐ Yes  
☐ No
- Why? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
13. Does your agency plan to use (or increase the use of) VANs over the next five years?
- ☐ Yes  
☐ No
14. Does your agency currently use local-area networks (LANs)?
- ☐ Yes  
☐ No (Go to 18)
15. Can you estimate the number of individual LANs that your agency has today?
- ☐ Number
16. What percentage of your LANs are integrated?
- ☐ %
17. What percentage of your LANs do you expect to be integrated five years from now?
- ☐ %
18. On a scale of 1-5 (1 being low), how important are integrated network services to your agency? (An integrated network is one which supports the transmission of voice, data and text over the same network)
- ☐ Rating
19. Does your agency have any specific plans to integrate the agency's networks over the next five years?
- ☐ Yes  
☐ No (Go to 21)

20. Considering your agency's plans to integrate your telecommunications networks, please rate on a scale of 1-5 (1=will not meet needs), which of the following approaches would best meet the agency's needs.

☐ FTS 2000  
☐ In-house staff  
☐ Contractor  
☐ Other (Specify): \_\_\_\_\_

21. Now, on the same scale (1-5), please rate your preference for each of the following as a means for acquiring additional, improved, or new telecommunications systems and services. (1=would prefer not to use, 5=most preferred means).

☐ Use GSA- or DCA-sponsored facilities  
☐ Buy common carrier-provided services  
☐ Buy VAN services  
☐ Buy integrated systems (including hardware, software, circuits, etc.)  
☐ Buy components and integrate in-house  
☐ Have contractor integrate agency-bought components  
☐ Other (Specify \_\_\_\_\_)

22. Does your agency currently use satellites as a means to meet the agency data networking needs?

☐ Yes  
☐ No

23. On a scale of 1-5 (1 being low) how important do you think satellites will be in meeting your agency's network requirements by 1995?

\_\_\_\_\_ Rating (If 3 or lower, ask why not higher?)

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

24. Has your agency considered the use of VSATs (very small aperture terminals) as a means to meet the agency data networking needs?

☐ Yes  
☐ No

25. On a scale of 1-5 (1 being low) how important do you think VSATs will be in meeting your agency's networking needs by 1995?

\_\_\_\_\_ Rating (If 3 or lower, ask why not higher?)

---



---



---

26. Does your agency currently use cellular communications services?

\_\_\_\_\_ Yes  
 \_\_\_\_\_ No

27. On a scale of 1-5 (1 being low) how important do you think cellular communications will be in meeting your agency's telecommunications needs by 1995?

\_\_\_\_\_ Rating (If 3 or lower, ask why not higher?)

---



---



---

28. Please rate, on the same scale (1-5), the importance of the following two services to your agency over the next five years.

\_\_\_\_\_ Electronic Mail  
 \_\_\_\_\_ EDI (Electronic Data Interchange)

29. In your opinion, please indicate on a scale of 1-5 (1 being not well at all), how well your agency uses telecommunications technology to meet the communications needs of the agency.

\_\_\_\_\_ Rating (If 3 or lower, ask why not higher?)

---



---



---

30. Now, in your opinion, what are the most significant factors that will affect your agency's use of telecommunications services over the next five years? (Top three). **Interviewer Note - Indicate either positive (P) or negative (N) factors. Circle P or N**

\_\_\_\_\_ P N  
 \_\_\_\_\_ P N  
 \_\_\_\_\_ P N



31. What would you consider to be the primary weaknesses of vendors that provide data network services to your agency? (Top three weaknesses)

---

---

---

32. What are the most important products and services that vendors should be able to provide over the next five years? (Interviewer Note - Consider factors such as new technology, cost, quality, training, support, etc.)

---

---

---

One last question.

33. What steps should vendors take to be more responsive to meeting your agency's telecommunications needs? (Top three.)

---

---

---

Thank you for your time.

## Vendor Questionnaire

### Federal Telecommunications Market 1990-1995

1. Does your company currently provide or plan to provide telecommunications systems or services to the federal government?  
 \_\_\_\_\_ Yes  
 \_\_\_\_\_ No (End of Interview)
  
2. From the following listing, please identify the types of systems or services that you currently provide and plan to provide by 1995.
 

Current	1995	
_____	_____	Hardware
_____	_____	Software
_____	_____	Professional Services (Consulting, Programming, etc.)
_____	_____	Voice Services
_____	_____	Data Network Services
_____	_____	Local-Area Networks
  
3. In your opinion, what will be the percentage increase or decrease in the federal telecommunications market over the next five years?  
 \_\_\_\_\_ % Increase (Go to 4)  
 \_\_\_\_\_ % Decrease (Go to 5)  
 \_\_\_\_\_ Remain the Same (Go to 6)  
 \_\_\_\_\_ Don't know (Go to 6)
  
4. Please identify the key factors that will contribute to growth of the federal telecommunications market. (Top three)  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
  
5. What are the key factors that will contribute to a decline in growth of the federal telecommunications market? (Top three)  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

6. In your opinion, which agencies provide the most attractive opportunities for telecommunications systems and services? Why?

---



---



---

7. Government agencies have a number of alternatives available for changing or adding to their telecommunications resources. Please rate, on a scale of 1-5, your understanding of government agencies' preference for each of the following as a means of acquiring additional, improved, or new telecommunications systems and services. (1=prefer not to use, 5=highly preferred means).

- ☐ Use GSA- or DCA-sponsored facilities  
☐ Buy common carrier-provided services  
☐ Buy VAN services  
☐ Buy integrated systems (including hardware, software, circuits, etc.)  
☐ Buy components and integrate in-house  
☐ Have contractor integrate agency-bought components  
☐ Other (Specify \_\_\_\_\_)

8. There are numerous technologies or combinations of technologies and services that can be applied to meeting federal agency needs. I'd like you to rate on a scale of 1-5 how critical each of the following is in the federal market today. (1=not critical, 5=very critical)

- ☐ ISDN (Integrated Services Digital Network)  
☐ VAN services (Value-Added Network)  
☐ LANs (Local-Area Networks)  
☐ Satellite Networks  
☐ VSAT Networks  
☐ Cellular Telephone  
☐ Network Management Systems  
☐ Electronic Mail  
☐ Electronic Data Interchange

9. Now, for each of the categories just mentioned, please rate on a scale of 1-5 (1 being not important), how critical each will be to meeting agency needs by 1995.

- ☐ ISDN (Integrated Services Digital Network)  
☐ VAN services (Value-Added Networks)  
☐ LANs (Local-Area Networks)  
☐ Satellite Networks  
☐ VSAT Networks  
☐ Cellular Telephone  
☐ Network Management Systems  
☐ Electronic Mail  
☐ Electronic Data Interchange

10. Considering FTS 2000, the government's project to replace the federal telecommunications system, please rate, on a scale of 1-5, how effective FTS 2000 will be in meeting government needs over the next five years (1 being not effective at all).

\_\_\_\_\_ Rating (If 3 or lower, ask why not higher?)

---

---

---

11. Now, also considering FTS 2000, please rate on a scale of 1-5, the effect that FTS 2000 has on your ability to market your services to the federal government. (1=no effect, 5=major effect).

\_\_\_\_\_ Rating (If 3 or lower, ask why not higher?)

---

---

---

12. In your opinion, what are the most significant factors that will affect the government's use of telecommunications services over the next five years? (Top three.) **Interviewer Note - These can be either positive or negative factors.**

---

---

---

13. Again, please rate on a scale of 1-5 (1 being low), how effectively the government uses telecommunications systems and services.

\_\_\_\_\_ Rating (If 3 or lower, ask why not higher?)

---

---

---

14. In your opinion, what major steps should the federal government take to make more effective use of telecommunications?

---

---

---



15. In your opinion, what should vendors do to be more responsive to the federal government's telecommunications needs?

---

---

---

16. Please identify the percentage of federal government revenues that you receive from each of the following categories of services.

**Percent**

\_\_\_\_\_ Hardware  
\_\_\_\_\_ Software  
\_\_\_\_\_ Professional Services  
\_\_\_\_\_ Voice Services  
\_\_\_\_\_ Leased Circuit Services (Incl. satellite, VSAT, etc.)  
\_\_\_\_\_ Value-Added Network Services  
\_\_\_\_\_ Other (Specify \_\_\_\_\_)

17. What was your company's total information systems and services revenue from federal business during your most recent fiscal year? Please indicate the year.

\_\_\_\_\_ \$ (millions)  
\_\_\_\_\_ Fiscal Year





